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ARCHIVES
OF
OTOLOGY

EDITED IN ENGLISH AND GERMAN

BY

DR. H. KNAPP
OF NEW YORK

DR. O. KÖRNER
OF ROSTOCK

DR. A. HARTMANN AND DR. U. PRITCHARD
OF BERLIN OF LONDON

VOLUME XXXII.

NEW YORK
G. P. PUTNAM'S SONS, 27 & 29 WEST 23D STREET

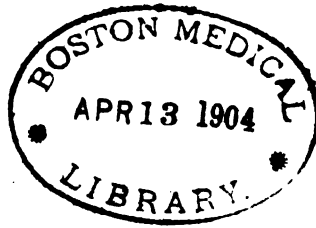
NEW ROCHELLE, N. Y.

LONDON: 24 BEDFORD STREET, STRAND

WIESBADEN: J. F. BERGMANN'S Verlag

PARIS: J.-B. BAILLIÈRE, 19 Rue Hautefeuille

1903



The Knickerbocker Press, New York



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ARCHIVES OF OTOLOGY.

THE LIMITS OF VARIATION IN THE DEPTH OF THE MASTOID ANTRUM.¹

By PHILIP D. KERRISON, M.D.

(With ten illustrations on Text-plates II.-V.)

WHILE all observers agree that the antrum may be reached at a depth of 8 to 10 *mm*, there is a surprising diversity of opinion as to the maximum depth, or the depth beyond which it is not safe to proceed in an attempt to expose the antrum. The following authors are cited as to its maximum depth: Gruber, 15 *mm* (a little less than $\frac{5}{8}$ inch); Politzer, 15 *mm*; Buck, $\frac{3}{4}$ inch; Dench, $\frac{7}{8}$ inch; Schwartze, 25 *mm* (about 1 inch); Broca, 29 *mm*, or about $1\frac{1}{8}$ inches.

Between the two extremes here expressed the contradiction is even greater than at first appears; for whereas Gruber and Politzer give 15 *mm* as the depth beyond which it is not safe to go, Broca contends that if the antrum is not reached at a depth of 25 *mm*, the surgeon should not be afraid to go still farther. Obviously one or the other view must be incorrect.

To bring order out of this confusing diversity of opinion, some fixed point upon the mastoid cortex should be agreed upon, from which to measure the depth of the antrum. This, in the writer's opinion, should be the one point which is always nearest the antrum—viz., the space just behind the spine of Henle, and inclosed in the well-known triangle formed by the postero-superior arc of the meatus and the

¹ Read before the Section on Otology of the N. Y. Academy of Medicine, March 12, 1903.

lines running tangent to the superior and posterior walls of the meatus respectively. This space we shall call for convenience the triangle of election.

As the antrum always lies immediately behind the tympanic vault, and as the postero-superior wall of the meatus always measures the distance between the vault and the cortical surface just behind the spine of Henle, it occurred to the writer that some relation might be found to exist between the length of the postero-superior wall of the meatus and the depth of the antrum.

To determine this, careful measurements were taken of thirty bones, taken at random as they could be obtained. In measuring the postero-superior wall of the meatus, the distance in millimetres was taken between Henle's spine externally and the inner margin of the meatus internally. Sections were then made, bisecting the mastoid cortex in a vertical line passing through the posterior boundary of the triangle of election, and cleaving the bone from before backward in a plane diverging from that of the posterior wall of the meatus by an angle of 30 to 35 degrees. These sections in every case exposed the antrum, and made it an easy matter to measure the thickness of the bone separating it from the mastoid cortex.

The measurements thus obtained seemed clearly to prove three facts: viz., 1st, that in different temporal bones much greater variations exist as to the length of the bony meatus than are noted in most text-books; 2d, that the depth of the antrum is always less by actual measurement than the postero-superior canal wall; and 3d, that the depth of the antrum rarely, if ever, exceeds 15 *mm*, or about $\frac{3}{8}$ inch. (See Text-plate No. II., Figs. 1 and 2.)

In the thirty bones presented for examination, the length of the postero-superior canal wall varies from 12 *mm* to 18 *mm* as follows:—in three it is 12 *mm*; in three, 13 *mm*; in eight it is 14 *mm*; in five, 15 *mm*; in eight 16 *mm*; in two 17 *mm*., and in one it is 18 *mm*.

In the same bones the depth of the antrum varies from 6 to 15 *mm*. These varying depths may be stated in their relation to the canal wall as follows:

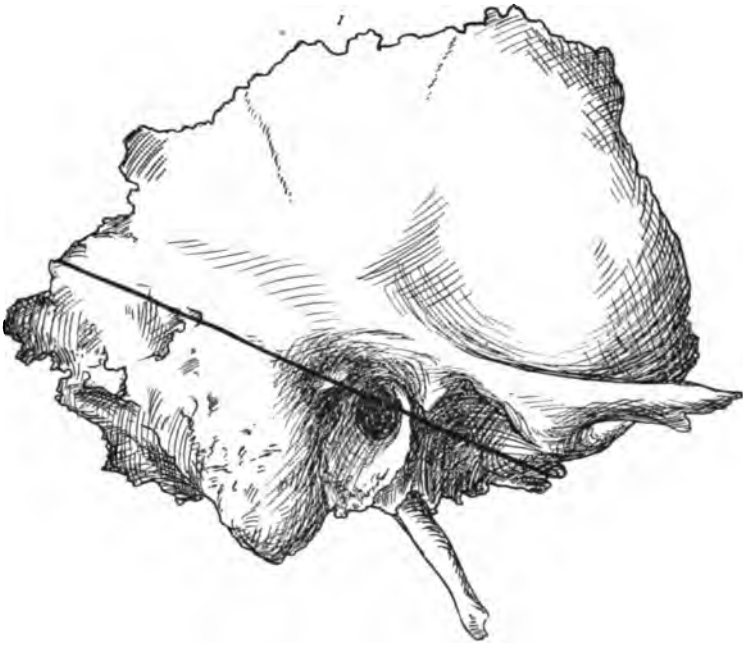


Fig. 1. Temporal bone — showing line of section passing through antrum and bony meatus.



Fig. 2. Top view of lower segment of above — showing length of postero-superior canal wall and depth of antrum (dotted line).

Postero-superior canal wall, 12 mm in depth, 3 bones; depth of antrum 7 mm, 9 mm, and 10 mm, respectively.

Canal wall, 13 mm long, 3 bones; depth of antrum 6 mm in one, and 10 mm each in the other two.

Canal wall, 14 mm long, 8 bones; depth of antrum 10 mm in two, 11 mm in four, and 12 mm each in the other two.

Canal wall, 15 mm long, 5 bones; depth of antrum 12 mm in three, and 8 mm and 11 mm in the other two respectively.

Canal wall, 16 mm long, 8 bones; depth of antrum 12 mm in two, 14 mm in two, and 9 mm, 10 mm, 11 mm, and 13 mm in the other four respectively.

Canal wall, 17 mm long, 2 bones; depth of antrum 11 mm and 12 mm, respectively.

Canal wall, 18 mm long, one bone with depth of antrum 15 mm.

An analysis of the above reveals a certain general relation between the length of the meatus and the depth of the antrum. Thus the average length of the postero-superior canal wall is 14.7 mm, and the average depth of the antrum is about 11 mm. The average difference between the length of the canal wall is 3.7 mm, the greatest difference is 7 mm, and the smallest is 2 mm. The deepest antrum in this series is 15 mm, and this extreme depth occurs in the one bone in which the canal wall measures 18 mm, the extreme length. But the point calling for special emphasis is the fact that the depth of the antrum, whether its cavity be large or small, is invariably less than the length of the postero-superior wall of the meatus, and never exceeds 15 mm.

Accepting the above conclusions as correct, it is difficult to explain the extreme views recorded by certain writers as to the depth of the antrum. Broca, for instance, gives 29 mm as the maximum depth of the antrum. For the preliminary opening in the mastoid cortex, he directs that a space one centimetre square be marked off, the upper border of this square to be on a level with, and the anterior border to be 5 mm behind, Henle's spine. The centre of this square is a full centimetre behind the spine, and marks in most bones the thickest part of the mastoid process. It

is not surprising, therefore, that Broca finds the antrum in some cases of unusual depth, for he enters the bone at a point from which it is necessary to work his way obliquely inward and forward, instead of directly inward as from the triangle of election. (See Text-plate No. III., Figs. 3, 4, and 5.)

If it were necessary to urge a further objection to approaching the antrum from this point, it might be found in the greater danger of exposing the lateral sinus. In alluding to reported cases in which the sinus groove was situated so far forward as to render it difficult to avoid injury to the sinus, Broca implies that in all his experience he has not met with such a phenomenon. Of a series of fifty bones examined by the writer, in two the sinus groove was so placed that it would be impossible in operating by his method to avoid injuring the vessel.

Politzer opens the cortex at a point 7 *mm* behind the supra-meatal spine, and yet gives 15 *mm* as the maximum depth of the antrum. It is worthy of note that he bases this estimate on a large series of bone sections.

Some of the extreme views as to the depth of the antrum may have been based upon observations made during operations upon the living subject. Such observations can have but little value, for the reason that it is impossible during the course of a surgical operation to make careful and exact measurements, and also from the fact that one is apt to receive impressions from the depth to which the probe is passed into the exposed antrum—*i. e.*, the depth of its inner wall. Naturally one might in this way receive an exaggerated impression as to the depth at which its cavity is entered.

This paper is a plea for greater exactness in the expression of anatomical facts having surgical importance. If we would measure the depth of the antrum from the triangular space behind Henle's spine, this fact should be stated, and from this point the antrum is never 1 inch, $\frac{7}{8}$ inch or $\frac{3}{4}$ inch in depth.

We must bear in mind that in the great majority of bones the level of the facial canal and horizontal semicircular canal is reached at a depth of 15 to 18 *mm* beneath the cortex.

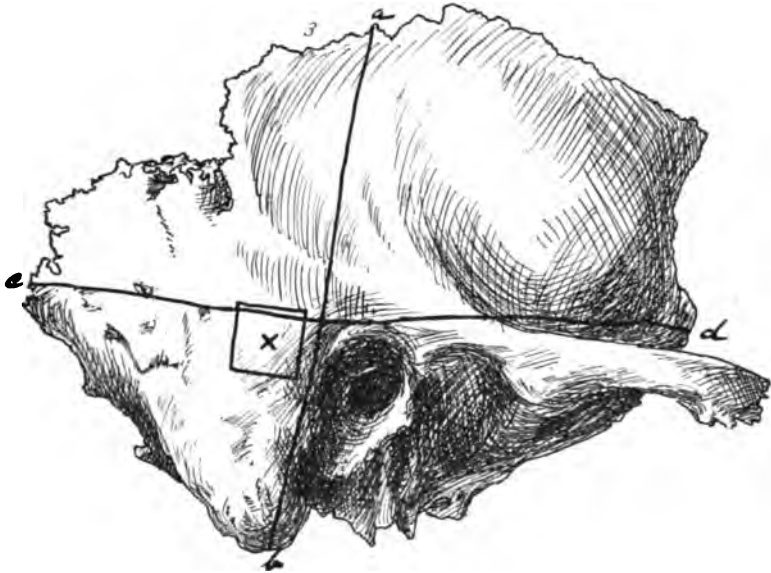


Fig. 3. Temporal bone — showing line of vertical section (ab), line of horizontal section (cd), Broca's square (x), and triangle of election.



Fig. 4. Top view of lower segment Fig. 1, through section cd —showing depth of antrum from triangle of election (black line), and from Broca's square (dotted line).



Fig. 5. Anterior view of posterior segment, section ab —showing depth of antrum from triangle of election (black line), and from Broca's square (dotted line).

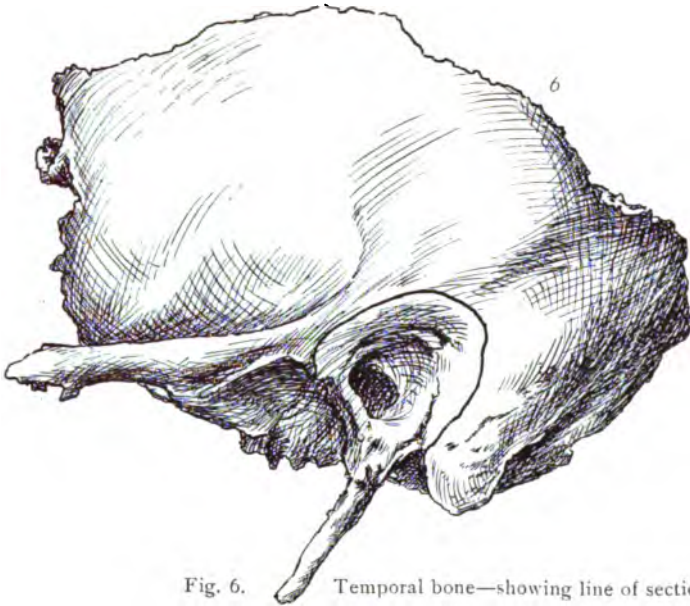


Fig. 6. Temporal bone—showing line of section.



Fig. 7. Same bone with section removed. Facial canal, with cord representing nerve, exposed in three places. Showing relation of horizontal semicircular canal and bend of facial canal to antrum.



Fig. 8. Portion of bone removed.



Fig. 9. Temporal bone—showing line of section.



Fig. 10. Side view of Fig. 9, anterior segment. Cord representing facial nerve. Horizontal semicircular canal and bend of facial canal exposed—showing their relation to antrum.

These structures are not confined to the circumscribed space covered by the inner tympanic wall, but extend well backward into the aditus, the semicircular canal lying behind, and the facial canal just below, that bony space. The tympanic portion of the aqueduct, presenting as a horizontal ridge just above the oval window, is certainly not the only region in which the nerve may be exposed to injury. The relation of the bend of the canal to the aditus and antrum is more intimate and surgically important than is generally recognized. This relation is very well shown in several of the writer's specimens presented to-night. (See Text-plates No. IV. and No. V.) When, therefore, we recall the statement of Broca, that if in the course of a mastoid operation the antrum is not reached at a depth of 20, 22, or 25 *mm*, the surgeon need not be afraid to go still farther, the importance of correcting so dangerous a dogma becomes obvious.

What we have spoken of as the triangle of election has been described by many writers as the surgical guide to the antrum.

So far as we are justified in drawing any conclusions from the measurements presented and facts adduced, they may be stated as follows:

1. That in operations upon the mastoid process the antrum should always be approached from the nearest point upon the mastoid cortex, which in the great majority of bones is the small triangular space just behind the spine of Henle.

2. That this point of attack not only furnishes a guide to the site of the antrum, but also gives fairly accurate data as to the depth beyond which it is not safe to proceed.

3. That the depth of the antrum is always less than the length of the postero-superior wall of the meatus; that in the great majority of bones it is not over 12 *mm*, is often very much less, and is never greater than 15 *mm*, or $\frac{5}{8}$ inch; and therefore—

4. That in a surgical attempt to expose the antrum a depth of $\frac{5}{8}$ inch should be regarded as the extreme limit of safety.

N. B.—The original drawings for this paper were prepared

from the writer's specimens by Dr. H. J. Prentiss, of the University—Bellevue Medical College,—to whom the writer wishes particularly to express his thanks.

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1. GRUBER's *Diseases of Ear*, p. 437.
2. POLITZER's *Diseases of Ear*, 3d edition, p. 513.
3. BUCK, *Diseases of Ear*, p. 436.
4. DENCH, *Diseases of Ear*, p. 438.
5. SCHWARTZ, quoted by Gruber. *Loc. cit.*, p. 438.
6. BROCA, *Surgical Anatomy of Ear*, p. 9.

INTRADURAL AND LATER DOUBLE CEREBRAL ABSCESS COMPLICATING CHRONIC TYM- PANIC SUPPURATION; OPERATIONS; CURE.

By B. ALEX. RANDALL, M.A., M.D., AND BARTON H.
POTTS, M.D., PHILADELPHIA.

(With a Temperature Chart.)

F. K., aged four years, came to Dr. Potts in the dispensary of the Children's Hospital with a history of discharge from the left ear for two years. Two weeks before being seen, the discharge ceased and the child complained of pain about the left ear. One week before examination, a slight swelling appeared behind the ear and she complained of headache, most marked in the region of the temple. She had not retained food for two days and vomited under examination.

Examination showed some œdema behind the auricle, but no fluctuation; some tenderness over the mastoid; upper and posterior canal-wall red and sagging; temperature 102° Fahr. Hospital care was advised, with probable operation.

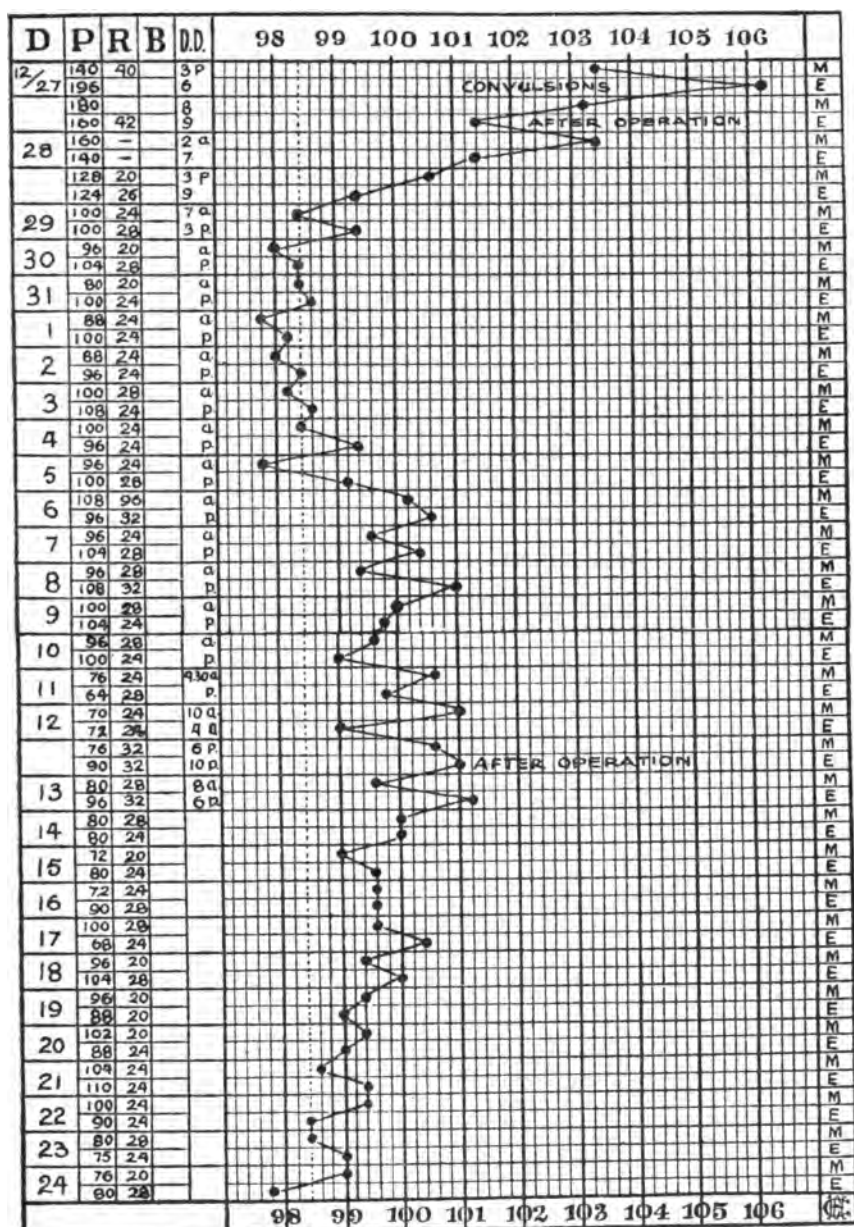
The patient was admitted to the house where she was soon examined by Dr. Randall, who arranged to operate at the earliest convenient hour. The eye-grounds and ocular movements were normal. A few minutes later the patient went into a general and quite violent convulsion, more marked on the right side, the muscles of the right side of the face and right eye being involved. At this time and on the return of the convulsions later, chloroform was administered, which quieted the movements except those of the right arm and leg, but upon the withdrawal of the anæsthetic the convulsion returned. The temperature rose to 106.2° Fahr. with pulse 180 and very thready. A lumbar puncture was done finding high pressure and drawing off between three and four ounces of clear fluid, which gave temporary relief.

Under ether, the usual incision for a mastoid operation was made by Dr. Potts, letting out a little pus from the sagging canal-tissues, and the intact mastoid was opened with a spoon. Some pus and granulations were found in and near the antrum and pus was seen flowing from up and back. With spoon and rongeur the course of the pus was followed until the middle cerebral fossa was freely opened and a perforation of the dura, 2 *mm* in width, was discovered, out of which the pus was pulsing. An incision 3.5 *cm* in length through the dura exposed the brain surface, which was carefully examined, but showed no sign of deeper trouble; so, after irrigation, the dural wound was sutured. A tympano-mastoid exenteration was then completed on account of the history of chronic suppurative otitis media.

The convulsive movements ceased during the operation and the patient's condition improved; the pulse being of fair quality, rate 160. A restless night was followed by paralysis of the right arm and leg. When dressed on the fifth day there was some protrusion of the cerebral substance, which showed pulsation. Temperature was normal and motion was returning to the right arm.

On the tenth day the temperature began to show some febrile reaction, and a study of the accompanying chart will show the interesting and significant discrepancy between the temperature and pulse-rate, the latter becoming more and more slow and out of proportion to the former. Its hourly noting was ordered. On the fifteenth day it fell to 64; but this through an error was not recorded on the bed-chart. The child seemed comfortable, took milk well, but vomited several times on the fourteenth day. On the sixteenth day vomiting began again and the urine was voided involuntarily; the child sank into a condition of semi-stupor; pupils equal and possibly slightly sluggish. No doubt could be entertained that brain-abscess demanded intervention.

As the cerebral surface was bare for a sufficient area it was deemed best to explore for brain-abscess without an anæsthetic. An Allis dry dissector was passed by Dr. Potts through the protruding and pulsating cerebral substance in a forward, inward, and slightly downward direction to the region of the tegmen. The blade was too quickly withdrawn after a little less than the full permissible penetration. It was then re-entered, passed a half inch farther, rotated partly in its track, and very slowly withdrawn. A trace of pus followed it. Forceps were then introduced and expanded and an abscess-cavity containing four or five ounces of



pus was evacuated. The cavity was treated by the usual method of douching with warm boracic-acid solution until the fluid came away clear and gently curetting the walls with pledgets of cotton; the wound was packed with iodoform gauze. During the operation the pulse rose to 88 and improved in quality; the patient regained color; she laughed and talked with no suggestion of discomfort, although about an hour was taken to complete the gentle evacuation.

The wound was dressed daily. On the third day the pulse had dropped again, and when the packing was removed there was a gush of fully six drachms of pus from a second cavity that was found to lie above and posterior to the original one. This was treated as the former one had been, but drainage by soft rubber catheter was substituted for the gauze.

From this time on convalescence was uninterrupted and the child is now, after ten weeks, running around with healed wound and apparently well.

Subdural abscess or limited leptomeningitis is rare, and its relation to cerebral abscess has not often been definite. It seems fair to claim that here the two lesions were consecutive and the brain-lesion caused by the infection from the surface, although no continuity could be traced. The tegmen, as studied from both sides at the first operation, seemed intact.



FIG. 1. Photograph of patient showing external dilatation of the nasal cavities (frog-face deformity).



FIG. 3. Internal surface of the skull; showing the honeycombed condition of the inner table. The photographs of the skull were taken by Dr. E. Harlow, to whom I am greatly indebted.

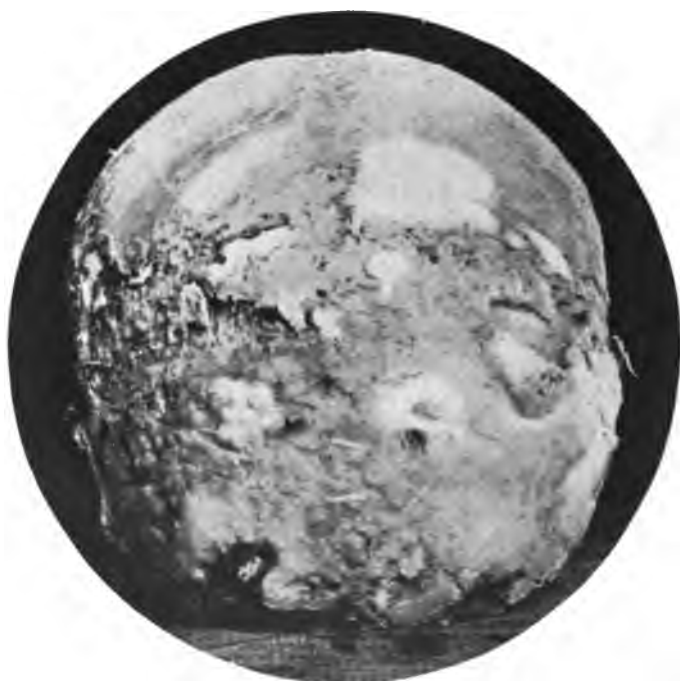


FIG. 2. External surface of skull viewed from in front; showing irregular defects in the outer table.

OSTEOMYELITIS OF THE SKULL WITH EMPY-
EMA OF THE NASAL ACCESSORY CAVITIES;
SINUS THROMBOSIS; PYÆMIA; DEATH;
AUTOPSY.

BY DR. ARNOLD KNAPP.

(With three illustrations on Text-Plates VI. and VII.)

M. M., twenty-one years old, an Irish servant girl of good family history, began to suffer from nasal occlusion and discharge five years ago, on the right and, shortly after, on the left side.

She later suffered from headache and the nose externally slowly broadened out. She began treatment six months ago; at least fifty polypi were removed from the nose, but with only temporary relief. She was then referred to me by Dr. C. B. Meding of this city.

On admission: September 8, 1802. Poorly-nourished young woman with a typical frog-face deformity. The nasal processes of the superior maxillæ are pushed forward and out and are situated about in the centre of the cheek. The lachrymal groove is occupied by a bony swelling, the displaced inner wall. Posterior to this, the internal orbital wall is pushed outward and prominent. The eyes are normal. On examining the nose, both nasal cavities are enormously dilated; the lower meatus is broad and the inferior turbinal is small and pressed against the outer wall. Above this, the nasal cavities are completely filled with a mass of polypi, hypertrophied nasal tissue, and thick white pus. It is impossible to locate the path of the pus as there are no landmarks. On the left side the polypi extend into the naso-pharynx. No history of syphilis. Right old otorrhœa.

Operation: September 9, 1902. Morphine-ether narcosis. Incision beneath right eyebrow and along side of nose to floor of orbit.

After retraction of the orbital contents the periosteum is found so thin over the os planum as not to be identified. The bone itself showed two openings in about the centre, round and smooth, evidently pressure-atrophies. The tendon of the superior oblique lay bare. There was no orbital tissue between the eyeball and the os planum.

On making an opening over the naso-frontal duct, pus from the frontal sinus appeared. The floor of the sinus extended out for three-quarters of the orbital roof and was removed. The mucous membrane was found partly detached, greenish, and covered with granulations. After removing the lachrymal bone and os planum, polypi were encountered, but no pus. The ethmoidal labyrinth was like a cyst. The changes were most in anterior part of nasal cavities. Polypi anterior to the head of the middle turbinal were removed; then, with the curette, the entire mass occupying the ethmoidal lateral body was removed. Moderate bleeding, controlled by packing. Sphenoidal opening not identified, nor were posterior extremities of turbinals removed.

The patient stood the operation without much shock. On the following day there was some fever. T. 104°, P. 120, and the region about the incision became very much swollen, red, and painful, suggestive of erysipelas. The tumefaction, fever, and symptoms, however, disappeared in three days. At first there was no discharge from the nose. Later there was a slight discharge and the nose would become occluded with very large crusts. The wound-healing progressed favorably until September 22d. There was some swelling about the wound, and the region of the left frontal sinus was very tender. The patient complained of headache and of the teeth being sore. Some granulations at the edges of the wound were removed, together with some polypi which had formed in the nose externally above the inferior turbinal, internally on the septum, and posteriorly, covering the sphenoidal cavity. An attempt was made to remove these with a curette, but without much success on account of the pain. The swelling about the wound increased, the picture of cellulitis appeared, the periosteum seemed lifted up from the frontal bone, and the suppurative process extended to the other orbit. Free drainage externally was established and a tube inserted. The patient suffered, from time to time, with very severe left-sided headache, which would persist day and night. The left nasal cavity was completely occluded and there was a large quantity of purulent

discharge. At the same time she took her nourishment very poorly and became very much depressed. Temp. 100° – 101° . The tenderness over the floor of the left frontal sinus suggested a retained empyema. While the condition of cellulitis persisted, it was thought best to defer opening the left accessory cavities.

October 5th. The conditions have somewhat improved. There is less swelling of the soft parts, and the condition inside of the nose seems cleaner.

October 7th. During the last two days the pain has again become very severe, and, though there still seems to be some superficial infection under the skin, operation is decided upon to relieve the left frontal sinus. The regions of the nose, forehead, and adjoining parts of the orbit are oedematous and swollen. The incision on the right side is contracted down to a short tract which passes directly backward into the frontal sinus of that side and also leads under the periosteum and skin of the forehead.

Operation: October 7th. A curved incision was made on the left side along the supraorbital margin down along the nose to the naso-labial fold. The subcutaneous tissue and periosteum were very much thickened. The periosteum seemed to be converted into granulations and was lifted up from the bone on the forehead and over the nose. It was possible from here to reach the communication from the wound on the other side. The bone was bare and rough. The entire area was curetted. The orbital contents were then separated from the upper and inner wall of the orbit. A similar condition to that described on the right side was found—namely, protrusion outward of the lachrymal and ethmoid bones, so that there were no orbital contents between the bone and the eyeball. The os planum was so thin that in places there were defects showing the underlying swollen mucous membrane. The frontal sinus was first opened into by removing the entire lower wall. It was found completely filled by an enormously thickened mucous membrane containing cysts. There was no pus and no perforation could be seen. The nasal process of the superior maxilla and the bone just back of this was then removed. A circumscribed mass composed of glassy swollen mucous membrane presented, corresponding to the anterior extremity of the ethmoidal labyrinth. The ethmoid was found converted into a mass of granulations and a polypoid degenerated mucous membrane. With one finger in the nose, as much of this loose tissue and thin bone as possible was removed with the curette. The

roof of the ethmoidal labyrinth appeared healthy. The disease extended quite far back, covering the sphenoidal opening, and in this region it was impossible to remove all the sharp projections of bone. The main part of the disease seemed to be situated in the anterior part of the ethmoid, corresponding to the dilatation of the nasal bones, though the septum, as far as could be seen, was not involved. Externally the nasal bones seemed to have become separated. The left nasal bone, more or less loosened and white, was removed. Before conclusion the right cavity of the nose was examined and some granulations which had formed anteriorly, posteriorly near the sphenoid, and externally just back of the inferior turbinal bone were removed. There was considerable hemorrhage which made the work on the left side particularly difficult.

Patient recovered from the operation without any shock.

During the next fourteen days patient much better, no headache. T. about 101° .

October 20th. Some frontal headache. Eyelids swollen.

October 23d. Symptoms relieved after removing some granulations about left middle meatus.

October 24th. Swelling extended up over right frontal eminence.

October 29th. Fluctuating swelling in this position; incision, evacuated thick pus from under periosteum. Does not take her nourishment well and is failing generally.

November 3d. Another opening made lower down in median line. Headache continues. Doughy swelling over forehead.

November 6th: Ether. Central vertical incision, opening up both lateral abscesses under periosteum, bone found roughened. Granulations and polypi removed from both nasal cavities. Both maxillary antra contained pus.

Suppuration on forehead gradually diminished. Right eye slightly prominent and swelling of upper lid for two days. This diminished. Diplopia. Teeth became very tender. Pain in head. T. varies 100° – 101.8° .

A week of relief from symptoms. Much brighter and takes nourishment well.

November 15th. Pain in teeth, forehead, and top of head.

November 27th. Swelling in right temporal region, later in left temporal region. Occipital headache. General condition better; some stiffness of jaw.

November 30th. Right temporal swelling opened; much pus

from under periosteum evacuated. Left incised; no pus. Fore head wounds doing well. Left lower orbital margin swollen. Swelling on top of head.

December 5th. Headache. Considerable discharge from external wounds.

December 16th. Treatment with mercurial inunctions and potassium iodide begun.

December 20th. Abscess in left cheek and at orbital margin opened. Deep pus beneath periosteum.

January 1, 1903. Deep abscess left temporal region opened.

January 10th. Condition much improved; wounds healing; in centre above roof of nose bare and black bone exposed.

January 20th. A swelling formed at lower margin of right orbit, closing lids. Incised; pus escaped, coming principally from outer surface of superior maxilla. A succession of soft circumscribed swellings developed, occupying both temples and the scalp half way back, also over right mastoid (old otorrhœa); incision evacuated thick yellowish matter surrounded by a thickened ring of periosteum, the bone underneath was roughened, the diploë exposed and granulating. No particular change in nose.

February 14th. During last three days, thin pus has flowed from all openings (streptococcus); the general condition is not so good. T. 102°. Pain behind right ear.

February 16th: Operation; with the kind assistance of Dr. Bolton. Vertical wound in forehead enlarged. A sequestrum beginning to demarcate and partly loose. It was removed; it measured $2\frac{1}{2}$ to 3 by 2 cm and included lower and anterior part of frontal bone down to nasal bones, and laterally some of the anterior wall of the frontal sinuses. An underlying cavity was filled with granulations; the margins of orbital plates and dura covered with granulations were exposed. No especial hemorrhage. The incisions in the scalp were connected by a lateral incision extending over the head and the periosteum was retracted. The bone was superficially necrotic, ulcerated, with granulations springing from diploë. The outer table of the bone was removed. The dura was exposed in two places and was apparently normal. The infiltrated area above right mastoid opened, pus evacuated; the small opening found in the squama in bone enlarged, dura exposed, covered with granulations.

Condition good. After this operation patient did surprisingly well; scalp wound and forehead rapidly assumed a healthier aspect. The nasal discharge was much less. The wound above right ear, however, did not improve, continued to discharge, and the patient referred all her pain to this region.

February 22d. T. gradually began to go up.

February 25th. T. 184.2°. P. 130. Complained of pain about right ear. No chill. Right ear contained granulations and epidermis scales. Wound in squama unhealthy and discharging. Induration in right subocciput and about root of jugular vein.

February 25th: Operation. Suboccipital area exposed. Negative, except mastoid vein was found thrombosed. Mastoid process opened, sclerosed; antrum contained granulations and debris. No extension. Going up and back an epidural abscess exposed situated over the commencement of sigmoid sinus. Removing cortex, this was found to communicate with upper opening; the sinus was then exposed down and back. It was thickened and hard. Anterior wall very thick. On incision a grayish firm thrombus removed. Cerebellar surface of sinus normal. Hemorrhage from above. With spoon contents removed towards bulb. No hemorrhage from this extremity.

February 26th. T. 101°. P. 108. Face drawn to left. Facial nerve presumably injured in attempt to expose bulb.

February 27th. Cough; pain between scapulæ. Respiration 32. Wound dressed, some pus from bulb. Lower half left chest-dulness on percussion, absence of breathing.

March 1st to 4th. Patient's general condition became gradually worse. Complained of pain in chest. Lower half right lung became involved. Pyæmic temperature 99°-105° daily variation. No chill. Pain in chest. Difficulty in breathing. No expectoration. Double optic neuritis with hemorrhages. Mastoid wound discharged pus. Parietal wound unclean, at centre; the bone appeared to be involved farther back. The wound over nose very clean. Some pus from nose. Some induration along right jugular vein. Gradually grew weaker. Restless and some delirium. Died rather suddenly at 11 A.M.—March 14th.

Autopsy, 5 P.M. Extremely emaciated cadaver. Wounds in forehead leading down to diseased bone. The central wound is quite deep, partly filled in with granulations. On top of scalp running from one side to the other a band-like area of exposed

bone, with granulations, discharge, and necrosed bone. In the right mastoid region large wound; cerebellar dura exposed. On retracting the galea a large periosteal abscess is found above and back of mastoid wound. The frontal bone shows disease in a band-shaped area 1 inch broad and extending from side to side; the outer table of the bone is missing, it had partly been removed at operation. The diploë is irregularly necrosed and covered with granulations; in two places the underlying dura is exposed. The process had stopped short of the coronal suture, except at two places in the centre where it has recently extended backward. The inner surface of the calvarium showed a honeycombed condition of the inner table of the left frontal bone. The adjacent dura was irregularly covered with small beads of granulations corresponding to the depressions in the bone. No pus on dura and no evidence of the process having passed this membrane at any point. The dura was incised; the meninges on the cortex appeared normal. After the brain was removed, the pia at the base from the chiasm backward to the pons was found clouded and thickened. The ventricles were distended with turbid fluid. No abscess or gross lesion. The right cavernous sinus was thrombosed. The thrombosis extended backward from the mastoid wound to the torcular and for some distance along the lateral sinus of the other side and the superior longitudinal sinus. The thrombus at the torcular was converted into an abscess. The dura on the base seemed normal; the cribriform plate showed no perforation. The nasal cavities exposed by removing the roof; the sphenoidal and maxillary sinuses contained thick pus. The walls of the nasal cavities, except the septum, showed thickening with infiltrated, polypoid mucous membrane. The jugular bulb contained a partly disintegrated and firm thrombus. The internal jugular vein showed a very much thickened wall; just below the bulb the lumen was contracted to the diameter of a probe, lower down it became dilated and was filled with thick pus. At the clavicle the purulent process in the vein was shut off as by a valve and the innominate vein contained fluid blood.

Remarks: The extent of the pathological changes found in the nose, sufficient to produce a distension of the neighboring structures, seemed to suggest a tumor. Microscopic examination of several pieces of tissue including bone showed only the ordinary inflammatory changes. There

was no history of syphilis and rigorous antisyphilitic treatment had no influence on the process. By removing the inner bony orbital wall access was had to the nasal structures, first on one side and at a later operation to those on the other. The morbid process was most intense at the extreme anterior extremity, where the nasal bones were pushed apart; one of these bones was necrotic and was removed. Both nasal cavities were successfully cleaned out except the posterior part of the lateral walls. Both frontal sinuses were involved. No reaction on the part of the orbital structures followed the operations, and the nasal condition was improved. The infection, however, extended upward in the diploë of the frontal bone. An osteomyelitis of a low-grade intensity spread upward and backward. After an interval of some weeks, deep subperiosteal abscesses developed in succession over the frontal eminences, the lower orbital margins, the temporal fossæ, and the vertical process of the frontal bone anterior to the coronal suture. Incision evacuated pus (streptococcus) underneath the periosteum collected in a circumscribed area, the bone in the centre showing an irregular defect in the outer table and granulations arising from the diploë. The process at no point appeared to have involved the inner table of the bone. Subsequently an abscess formed in the squamous portion of the right temporal bone about 3 *cm* above the mastoid fossa. On incision the entire thickness of bone was found involved and the dura lay bare covered with granulations. This wound did not do well. The temperature, which had previously varied between 100° and 101°, rose abruptly and the right suboccipital area became indurated. Involvement of the sigmoid sinus was suspected, and on enlarging the wound in the squama backward an epidural abscess was found situated over the upper knee of the sigmoid sinus. The sinus was filled with a thrombus and was completely evacuated. Signs of pyæmic extension had already become marked in the lungs. The eye-grounds presented a very marked optic neuritis with hemorrhages. Under the picture of pyæmia the patient died rather suddenly after fourteen days, or six months after the first operation.

The autopsy showed that the inner surface of the bone over the left frontal lobe was honeycombed, a dilated condition of the natural channels in the bone; the underlying dura was covered with small granulations corresponding to the depressions in the bone. There was no free pus; the process had evidently been kept in check. No meningitis. The thrombus of the torcular was converted into an abscess. The ventricles were distended with turbid fluid. The jugular bulb was filled with a partly softened thrombus, and the jugular vein just underneath was nearly obliterated; in the neck the walls of the vein were very much thickened, and the lumen was filled with pus. This was sharply shut off at the junction with the innominate vein. The sphenoidal and maxillary sinuses contained pus. The chest cavity was not examined, but presumably would have shown the lesions of metastatic pneumonia and empyema.

In brief the morbid process began as an inflammation of all the parts of the ethmoid bone (an osteomyelitis), associated with empyema of all accessory cavities of the nose; then an osteomyelitis of the frontal bone set in, extending to the squamous portion of the temporal bone on one side and causing an epidural abscess with thrombosis of the sigmoid sinus, pyæmia, and death.

A DISCUSSION ON THE DIFFERENTIAL DIAGNOSIS AND THE TREATMENT OF OSTEOSCLEROSIS OF THE MASTOID PROCESS.¹

BY OTTO J. STEIN, CHICAGO, ILL.

THE mastoid process of the temporal bone in the first few years of life is composed of fine cancellated bone tissue, which gradually undergoes absorption, giving place to the presence of a series of more or less well-formed air cells (1).

These cells communicate with one another and sprout, as it were, from the parent cell or antrum. They are lined with the same delicate and highly vascular mucous membrane as that found in the tympanum and antrum.

The mucous membrane lining the mastoid cells plays a double rôle, in that it is mucous membrane to the cell cavities, and periosteal covering to the bone. The cells receive their secretion from the membrane; the bone, its nourishment.

A chronic congestion of the membrane results in a low grade of inflammation that tends, on the one hand, either to thickening or to pus formation, and, on the other hand, to an osteitis with a resulting hyperostosis, caused by the hypernutrition; or pus formation as the result of caries or necrosis.

These conditions, of course, may co-exist or occur independent of one another. The hyperostosis may exist as an idiopathic disease, the result of a previous inflammatory

¹ Read before the eighth annual meeting of the Academy of Ophthalmology, and Oto-Laryngology, held at Indianapolis, Ind., April 9, 10, and 11, 1903.

condition of the tympanum or antrum, but developing itself after the latter had subsided ; and, on the other hand, it may develop as an accompaniment to an active morbid condition within the tympanum or antrum, or both.

In the hyperostosis we have the formation of new bone cells from the periosteum and also from the medullary spaces. This proliferative process may continue so that all of the cells may be obliterated, the new bone tissue finally becoming so compact and hardened as to merit the name of "ivory-" or "ebony-like." This process is known as osteosclerosis or eburnification of the mastoid bone.

It is very easy for us to trace the development of our knowledge on this subject, because it is a knowledge of but comparatively few years.

The first recorded reference to the subject that I could find is in the early writings of Schwartze and Politzer. Vague, incomprehensive, and perhaps doubtful as they may have seemed, they nevertheless directed the inquiring and progressive otologic mind in the direction that has developed into a knowledge that to-day gives to the subject a distinct and individual place in the pathology of mastoid disease. What the subject still lacks, though, is a clinical picture that will awaken in the mind of the otologist the necessity of differentiation between conditions productive of similar symptoms, which, thoroughly understood, gives to him the requisite conviction to apply a remedy potent with decided and prompt relief.

Schwartz (2) says: "Sclerosis is a frequent sequence of chronic purulent inflammation of the middle ear, the cells gradually contracting and finally disappearing."

In the report of the American Otological Society of 1870, Dr. C. R. Agnew (18), of New York, probably makes the first recorded reference to this condition, in the following words: "Caries is not the invariable and immediate result of mastoid-cell disease, but sometimes there may be, instead, an osteitis, with hyperplasia of the bone, filling a few or all of the cells."

From this time on several investigators followed up the subject very carefully, and in 1873 Buck (3), in an article on

mastoid disease, referred to the condition under the head of Hyperostosis of the Mastoid Process.

Shortly following upon this time, 1876, J. Orne Green (4), of Boston, Mass., as is shown in the *Report of the International Otological Society of 1876*, and in the *Transactions of the American Otological Society of 1880*, attempted to diagnose a specific mastoid disease known as Hyperostosis of the Mastoid Process; and three years later Dr. Arthur Hartmann (5), of Berlin, published in the ARCHIVES OF OTOLOGY, 1879, a paper in which he sets forth a statement recognizing that an idiopathic disease of the mastoid process may exist as an osteosclerosis with definite symptoms.

In all the four cases reported by Green, in 1876, in connection with his article on Hyperostosis of the Mastoid, there was present a chronic purulent inflammation of the tympanum, associated with the hyperostosis of the mastoid, and sudden acute symptoms arising, operations on the mastoid were carried out, with the result that nothing but a hyperostosed condition was found, although complete relief from pain was brought about by the operations.

In three cases reported by Buck (6), in 1883, all were associated with running ears in their early history. One case was lost sight of, the others were operated upon solely for the mastoid pain, the discharge having stopped for years, and complete relief was afforded after the patient had suffered for several months.

A most excellent exposition of the condition is given by J. A. Lippincott (7), of Pittsburg, Pa., in his report of "A Case of Mastoiditis Interna Chronica with Sclerosis," before the seventeenth annual meeting of the American Otological Society, 1884. In this case, like the two cases reported by myself (8), the chief symptom was pain, without any marked evidence of existing middle-ear disease that would otherwise demand relief. This case, like my own, made an excellent recovery after trephining the mastoid process.

From the foregoing remarks it will be seen that there are two varieties of this condition: one where the sclerosis is associated with a suppurating process within the tympanum or antrum, and the other without any associated suppurative

tion. It is with the latter that I wish to deal particularly. In this latter variety we may include those cases that may have a history of a former suppuration, as well as those in which no such history or existing evidence can be had.

In the simple or uncomplicated variety of mastoid sclerosis the symptoms are few in number. Hence it becomes a matter more of differentiation between disorders with similar symptoms. No doubt many cases of hardening of the mastoid process exist wherein the patient complains but little or perhaps not at all. But in cases where pain is complained of, there is little else, aside from this symptom, that remains characteristic of the disorder.

Hence pain is the preponderating symptom present, and one from which the patient seeks relief. The subject, therefore resolves itself into a discussion of the varieties of ear pains and their characteristics.

A chronic pain in or around the ear may be studied under four heads:

First, otalgia, associated with an internal or middle-ear or antrum trouble.

Second, hysteria, neurasthenia, and malingering.

Third, neuralgia from other causes than ear troubles.

Fourth, osteosclerosis of the mastoid process.

Otalgia from Associated Ear Troubles.—Pain, as a result of trouble with the external, middle, or internal ear, reveals its true character mainly in its association with such disturbances. As, for instance, a foreign body or a neoplasm within the ear canal is seen upon careful inspection, and with the removal of the same the pain disappears. Pus, granulation tissue, or cholesteatoma in the middle ear or antrum may be demonstrated either by ocular examination, the use of the probe, microscopic examination of the washings of the ear, and by other well-known methods. In all these conditions the character and duration of the pain differ from that of osteosclerosis, in that it seldom reaches the acute exacerbation; nor is it so persistent or prolonged, and, as a rule, it is amenable to some of the ordinary measures of treatment.

Hysteria and Neurasthenia.—The chronic pains of the malingerer, the hysteric, or neurasthenic may at times be

more difficult to differentiate. In all such cases we must be broad-minded and far-seeing enough to take into consideration the entire domain of medicine. For instance, in order to eliminate the possibility of a neurasthenic condition, we must ask ourselves whether our patient is suffering from the results of an exhausted state of the general nervous system. Is he in a depressed mental state, associated with a worn-out and tired feeling, lacking ambition during the day and wakeful at night? If so, further inquiry will reveal the fact that he has been working under pressure or at a high tension. Long, hard days, and perhaps nights of exacting or tedious duties, coupled with a disregard for proper eating and necessary exercise, establish in the mind of the physician the true nature of the malady.

On the other hand, should our study of the case bring to light some of the following symptoms, we may reasonably suppose that we are dealing with a condition of hysteria: an inclination to complain of the physical or mental state; a tendency to exaggerate existing symptoms; given to extreme expressions of emotions; great imagination; subject to disorders of sensations, like globus hystericus, tinnitus aurium, epigastric pains, headaches, eructations, tympanites, chilly sensations with yawning and stretching, diuresis, muscular twitchings, cramps, convulsive attacks, neuralgia, hyperæsthesia, anæsthesia, analgesia, aphonia, functional paralysis, cough, retention or suppression of urine, rigidity of neck, tenderness of nape of neck, etc.

So much for generalities. Now let us look more particularly at the aural symptoms. In the earache complained of by the hysteric the pain more frequently is located in the auditory canal and in front of the ear. Besides, pain is referred to the temple. The mental state, as well as the condition of the general health, influences the severity of the pain. That is to say, when the patient is much depressed he is sure to complain most; but when his spirits are at their best he complains none at all, or but little, and then the location of his complaint is but ill-defined, or it is located in an entirely different place.

One of the characteristic things about hysterical affections

of the ear, as Gradenigo (9), Politzer-Brühl (10), and others have pointed out, is that there is an association of sensory disturbances about the parts. While the patient may complain very severely of pain within the ear and about the mastoid region, careful examination frequently discloses anæsthetic or hyperæsthetic areas about the pinna or auditory canal, as well as in other parts of the body. Moreover, the patient may complain of paræsthetic sensations somewhere within or about the ear, like a sense of formication within the canal, or as if there were something animate within, and again as if there were a slight discharge. Some cases present neurotic disturbances of the eighth nerve, manifesting themselves either as a hyperacusis or paracusis, tinnitus aurium, periods of momentary deafness, nausea, and vertigo. In other cases there may be present transitory disturbances of the motor nerves of the face, like twitching of the muscles or even a paralysis. Often the opposite ear becomes involved without any objective symptoms.

Voss (11), in discussing the subject of ear disease and hysteria, says the diagnosis of hysteria must in the first place be supported by heredity; the disturbances of cutaneous sensations are important; the anæsthesia varies as to time and place; the tuning-fork generally is not heard by bone-conduction on the affected side; and finally, the condition is generally found in women between the ages of twenty and thirty years.

Lannois and Chavanne (12), from their large experience and the great number of cases treated, advise the employment of suggestion in the treatment of hysterical mastoid cases. Their good results in these cases give to us an additional means of differentiating between an imaginary and a real affection.

Jendressik (13) describes a number of cases of neurasthenic neuralgia and says the subjects always exhibit the stigmata of neurasthenia, and that a hereditary predisposition can be almost always discovered. There are none of the objective phenomena which accompany genuine neuralgia. The patients are able to keep their mouths and teeth clean, and like to do so when the neuralgia is in the face,

while in genuine neuralgia they shrink from the slightest contact with the parts.

Neuralgia from Other Causes.—Under the heading of neuralgias we have a long list of disorders that may give rise to ear pain. The pain due to chlorosis, anæmia, malaria, and influenza may, aside from other symptoms diagnostic of their nature, be differentiated by characteristic conditions of the blood as found in these representative disorders.

It is very proper at this point to emphasize the importance of securing additional aid to clear up the diagnosis, by the examination of the blood and urine. The examination of the blood has become almost a universal practice among surgeons of to-day, and particularly as to its significance in acute suppurative processes (16). It is interesting to note in this connection a case reported by M. D. Lederman (14), which clinically simulated mastoiditis, but on exploring the mastoid process nothing was found, the case afterward proving to be one of malaria.

In case of syphilis, the history of an infection and the knowledge that the pain is not so persistent but characteristically severe at night, are usually sufficient upon which to form an opinion.

In rheumatism, the involvement of other parts of the body, the marked periods of remission from pain, and the aid received from urinalysis suggest the nature of the disorder.

Ear pains as a reflex expression of a disordered condition are not uncommon. Instances of such disorders are seen as the result of diseased teeth, gums, and the tongue. Körner (15), in discussing neuralgia of the ear, refers to a case of tympanic neuralgia due to an abscess in the tongue. The pain was increased when pressure was exercised on the hyoid bone. He has repeatedly observed the increase of pain in the ear of tympanic neuralgia from carious teeth, on pressure in the hyoid region, and considers this a diagnostic symptom.

Other reflex pains may arise from nasal or laryngeal disturbances. Pain in the ear has been reported as a result of

caries of the vertebræ, and similar reflexes have originated from the brain and sexual organs.

The pain of a neuralgia shoots in the direction of a nerve trunk and its branches. In cervico-occipital neuralgia the painful and tender points are situated as follows: between the mastoid processes and the cervical vertebræ; on the parietal side of the head; on the mastoid process; in the concha, and it may also be manifested in the temple and the ear canal. A point well borne in mind is that cold or heat, when applied to the affected nerve or its branch, frequently aggravates the pain.

One will at times observe neuralgia in a case of debility following a siege of some acute affection or some chronic disease.

Osteosclerosis of the Mastoid Process.—The symptoms of osteosclerosis are mainly centralized into that of pain. In the uncomplicated variety of this disease the almost negative results of our examination strengthen our diagnosis. On inspection of the drum membrane, most likely nothing of any note will be seen, although it may show the usual changes that are present as a result of a former otitis media catarrhalis or suppurativa. The retro-auricular region seldom shows anything pointing definitely to the involvement of the interior. In some cases, particularly when accompanied by a chronic suppuration of the middle ear, or in cases of cholesteatoma and also in the formative stage of the simple variety, we may discover a slight redness of the overlying skin and a light degree of œdema. Firm pressure over this area will discover a spot, usually located on a line with the meatus, that elicits a sharp sensation of pain. The tenderness is not limited necessarily to this region, but at times it may extend over quite a large area. But what is particularly worthy of note is that the auricle, integument lining the auditory canal, the region in front of the tragus and just beneath the lobe of the ear, are not at all sensitive to the touch.

The pain complained of by the patient is almost always continuous and extends over a long period, from days into weeks, and weeks into months, with only remissions, but

seldom intermissions; although at times, by the mere fact of its long continuance, the patient may become so accustomed to the milder stages of the pain as to be apparently unconscious of its presence.

The pain is accompanied at times by sudden exacerbations of an acute throbbing or boring character, deeply seated in the ear and mastoid process. In some instances it may radiate up to the side of the head and down into the neck and again back to the occiput, but, as a rule, it is not associated with pain in or anterior to the meatus.

Deafness may be complained of according to the amount of involvement of the conductive or perceptive apparatus.

Usually there is an absence of tinnitus and vertigo.

A slight rise of temperature may be noted in the early stage of the disease when the new bone tissue is forming, but later, during the hardening period, it is never present.

Age does not seem to bear any causative relationship to the disease.

The employment of auscultation, percussion, or transillumination has as yet proven of no convincing value to me in the diagnosis.

One final word now as to the possibility of error in determining between a purely neurotic disorder and one of osteosclerosis, and that is, in the proper individual, who is susceptible and impressionable, the persistent, nagging, torturing, and often agonizing pains incident to a case of osteosclerosis, may soon bring forth the latent qualities of a full-fledged hysteria, just as it brings forth the demand for powerful sedatives and analgesics to relieve him of his suffering, until finally he finds himself a helpless, miserable, and pitiful subject of the drug habit.

Treatment.—In considering the treatment of this condition, we may divide the subject into the medical and the surgical.

Under the medical treatment we will refer to all such measures employed other than that of operative.

Remedies of this class, to be of any particular value, should be used in the early stage of the disease—that is, where there is great vascularity as a result of the new bone-

forming process. At such a time the various rubefacients or epispastics may be tried, such as mustard, capsicum, cantharides, ammonia, camphor, and turpentine. The methods of "firing" and acupuncture are little used nowadays, but in their stead we may find the employment of the X-rays and mechanical vibrations. The leech, dry cups, and galvanism are remedies familiar to all.

The surgical treatment is the important part of the therapeutics of the disease. Notwithstanding the advice and practice of such authorities as Politzer (23), Hartmann, and Knapp, one is amazed at the apparent apathy, part ignorance and also prejudice, existing relative to the employment of operative measures in this particular condition.

As far back as 1875, Professor Gosselin (17) read a paper before the Paris Academy of Sciences, entitled "Osteo-Neuralgia of the Long Bones," in which he advises trephining in order to relieve the pain. That this same view is held to be applicable in cases of osteo-neuralgia of the mastoid is seen by reading the opinions of men like Politzer, Green, Buck, Hartmann, Schwartz, Knapp, and others.

Buck says: "We should not hesitate to perforate the bone," in order to bring about relief in these conditions.

Schwartz (19), the pioneer in mastoid surgery, the man to whose personal efforts through research and indomitable courage aural surgery owes a great deal of what is good and beneficial to-day, advocated and practised operating on the mastoid in cases of intense and uncontrollable pain of the mastoid process.

Hartmann (5) says: "Practice proves that the symptoms of violent pains, in connection with idiopathic sclerosis, can be relieved by opening the mastoid process."

Sattler (20) cites numerous cases illustrating the condition under discussion, which upon operation gave permanent relief.

Herman Knapp (21) has repeatedly operated for osteosclerosis of the mastoid process, with success as to the relief of pain in all cases.

Trephining the skull is practised by many surgeons for the solitary symptom of headache. Siegel (22) cites such a

case and reports finding eleven similar interventions on record. All cases are reported cured by the operation.

As I have already stated in a previous paper on this subject, after having made your diagnosis and exhausted the simpler means of relief, an operation of opening into the process is the only rational, positive, and successful means of putting an end to the patient's suffering.

Where we decide to operate in a case associated with hysterical stigmata, it is important not to burden the patient's mind with any doubtful prognosis, but, on the contrary, carry conviction with our words by predicting a most hopeful outcome.

In operating, our object is to relieve bone tension, and with this in mind we should remove as large a core of bone as possible, making the superficial circumference of the opening of large diameter, and the edges and surface of the cavity clean and smooth.

In the uncomplicated variety of this disease, it may not be necessary to penetrate into the antrum. In fact, the rule is not to.

In conclusion, allow me to urge upon you the recognition of a broader field for surgical intervention in affections of the temporal bone. The modern surgery of the mastoid process has given to us the ways and means whereby serious symptoms and fatal results may be thwarted, and the revelations made to-day by such procedure explain the lethal cases of former years. Although the condition of sclerosis is not, as a rule, associated with the possibilities of a fatal issue, it very often makes itself manifest by such uncontrollable pain that it leads the patient a life of intolerable suffering, which evokes within him such a strong desire for relief that the drug habit is soon acquired. In the face of such a condition or such prospects, can we as otologists of to-day remain unmindful of the mental and physical deterioration that results from such state of affairs, and with a remedy so potent and powerful in our hands refuse to be moved by the sense of what is our proper and legitimate duty?

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THREE CASES OF ENCEPHALITIS IN CONNECTION WITH OTITIS MEDIA.

BY DR. VOSS, RIGA, RUSSIA.

Abridged Translation by Dr. JULIUS WOLFF, New York.

STRÜMPPELL'S effort to trace the cause of cerebral infantile paralysis to an encephalitis has led to the publication of many articles upon this subject. Although these matters are of no direct interest to otologists, still it is evident that the picture of the so-called acute, hemorrhagic, non-suppurative encephalitis may also at some time be encountered in a patient suffering from an otitis media. In 1897 Oppenheim, treating the subject of encephalitis in Nothnagel's *Spec. Pathologie u. Therapie* (vol. IX., ii., 3d edition, p. 17), made the statement that while reviewing the literature he had been impressed by the fact that relatively often patients with encephalitis were also afflicted with an old or a recent purulent otitis. While demonstrating a patient before the Berlin Society for mental and nervous diseases on December 11, 1899, Oppenheim described the disease as follows: "In all five cases there developed, acutely and with the symptoms of an infectious disease, a cerebral affection which from the very outset presented, in addition to the general cerebral symptoms, focal symptoms, such as motor aphasia, usually in conjunction with right facio-brachial monoplegia (twice beginning with cortical epilepsy). Whereas the general symptoms usually quickly subsided, the focal symptoms alone persisted for some time."

The history of Oppenheim's case was as follows:

A student, seventeen years of age, had suffered since his first

year from double suppurative otitis media with occasional exacerbations. Last purulent discharge at Christmas, 1898; during the latter half of that year occasional dizziness, otherwise healthy.

January 31, 1899. In the evening complained of pain extending from the right ear into the right arm. That night repeated vomiting.

February 1st. In the morning, severe *clonic convulsions* on the right side of the face and in the right arm, followed by *loss of speech*. Temperature 105° F., no chills, no headache. At eleven o'clock that morning the convulsions returned and were succeeded by unconsciousness. Examination of the ear showed no signs of acute inflammation nor of retention. No point of tenderness to percussion on the skull; eyes normal. Treatment: calomel, icebag, leeches on the left side, phenacetin.

February 1st. Paralysis of the right arm. From February 2d to 6th slight general improvement, but during the following days temperature again rose, pulse fell to 54, vomiting, unconsciousness, and *paresis of right facial nerve*.

February 11th. After thorough emptying of the bowels and a hot bath, followed by sweating, the improvement became marked and progressive and the mind became clear.

July 26th. Still slight weakness of right facial nerve and hand. Complete motor aphasia. "Yes" and "no" was his whole vocabulary and words were repeated with difficulty. Ability to write was least impaired for he could put on paper many words missing in his speech. Writing could be interpreted to a certain degree and he was able to understand simple spoken words and sentences, *e. g.*: "stand up," "show your tongue," etc.

Oppenheim in this article states that the above is the third case in which he established a relationship between this acute non-purulent encephalitis and purulent otitis; he also refers to a publication of Jaksch (*Prager med. Wochenschr.*, 1895, No. 40) and states that recently he had been informed by Jansen of a case corresponding to his own observations.

All of his five cases took a favorable course and it was merely owing to the fact that in one of them a wrong diagnosis had previously been made elsewhere, which led to a trephining, enabling him to corroborate his diagnosis with an autopsy

This case is published in the *Deutsch. Zeitsch. f. Nervenheilk.*, vol. xv., 1899, p. 2.

A seamstress, sixteen years of age, suffering for several weeks from moderate gastric symptoms, two days ago became afflicted with severe *headache, vomiting, dissiness, chills, and fever.*

April 16th. Patient's mind is clouded, temperature 103.6° F., pulse 140. Pupils are equal and react. *Paresis of left abducens nerve* and diplopia. The region of the left mastoid process, and the left side of the head and neck seem very sensitive to pressure.

The physician in charge, suspecting an empyema of the left mastoid bone and thrombosis of the transverse sinus, decided, on account of the gravity of the cerebral symptoms, to perform an immediate operation. When the mastoid process was opened no pathological conditions were found in either the periosteum or the cells, while a puncture of the bared sinus with the needle brought out only blood. The dura was not incised and paracentesis of the drumhead revealed nothing abnormal.

April 17th-20th. High temperatures and pulse, and marked restlessness.

April 21st. Development of *complete aphasia* and a *facio-brachial monoplegia* on the right side. Ability to understand spoken words is retained, but there is *complete motor aphasia*. Sensation even on the right side well preserved. No ocular symptoms.

Oppenheim's diagnosis was: acute non-purulent encephalitis of the left frontal lobe or the left fronto-central area. Prognosis doubtful, but favorable course not excluded.

On the following day there were clonic contractions of the right arm and leg. In the next few days *improvement in the patient's condition* showed itself, the mind becoming clearer and the right arm regaining some motility.

April 26th. Some words could be uttered, and on the next day the aphasia was no longer complete but merely ataxic. During the following weeks speech returned fully and the paresis of the right arm disappeared. The operative wound made very slow progress toward healing and in June it was noticed that the bandage was frequently saturated with cerebro-spinal fluid. Through this poor condition of the wound the patient's general health

suffered, and she complained of headache and vertigo. An operation to cover the raw surface was, therefore, decided upon and undertaken on July 30th. The bone was found to be soft and brittle and had to be removed so extensively that the sinus and bulb were exposed. (At the autopsy the diseased bone was found to reach to the internal meatus.) The large cavity was tamponed with iodoform gauze and for some days the patient did well.

August 23d. Severe brain symptoms set in, and on September 17th she succumbed. The autopsy revealed purulent cerebrospinal meningitis and a thrombus one and a half inches long in the jugular bulb, broken down in its centre. Besides the changes caused by the meningitis there was a diseased focus in the left frontal lobe in the region of the third left frontal convolution and the foot of the anterior central convolution.

This case teaches us that, in addition to the group of symptoms as described in the beginning, there may be present another and very important symptom—namely, tenderness on pressure or tapping of certain parts of the skull.

This pain has been observed in various parts of the skull. But for us it is of vital interest to know that it may occur in the region of the ear and thus may be the occasion for an operation. It has even been observed in this locality when there was no ear-trouble present, as in one of Oppenheim's earlier cases.

Another of the symptoms of encephalitis that has been observed in cases without aural disease, which I wish to mention as interesting us particularly, is choked disc.

The diagnosis of hemorrhagic encephalitis has also been made by me in the following cases, but not till after the operation.

CASE 1.—In a patient suffering from left acute purulent otitis media and on whom I performed the mastoid operation, there occurred on the evening after the operation a sudden *rise of temperature* to 102° F. accompanied by *aphasia*, drowsiness, and, as the temperature began to fall, *a slowing of the pulse* to fifty-six beats per minute. At the same time the mastoid bone was tender, especially at a point above and behind the ear, superior to the antrum. At the operation pus and granulations were found in the spongy portion as well as in the antrum. The bone adjacent

to the dura was not diseased. The dura, laid bare and incised, was normal and the subjacent temporal lobe had a dark bluish-red appearance. Punctures of the latter in every direction revealed no pus. The patient recovered in a short time after the operation. Naturally it was impossible to ascertain the extent of the disease during the operation, since only 2 or 3 *sq cm* of the temporal lobe were exposed. There was no softening of the brain; on the contrary, the consistency was, if anything, firmer than normal. I mention this particularly because the patient's wife claimed a traumatism had preceded his illness.

I resorted to the operation on account of the threatening brain symptoms, without knowing about Oppenheim's article. My attention was drawn to it only when I presented the patient before the Society for General Practitioners at Riga. Whether the operation, according to Oppenheim, was unnecessary or whether it contributed to a more rapid recovery I do not venture to decide. I can merely state that the aphasia disappeared completely in ten days.

CASE 2.—On the eleventh day after a left-sided radical operation there occurred a single rise of temperature to 99.8° F. with headache and drowsiness, and with the pulse slowing down to 48, and the patient became aphasic. Here also there was a distinct point of tenderness above and behind the wound which showed no sign of inflammatory reaction. Later paresis of the right abducens appeared. A second operation exposing the middle cranial fossa was performed. The expected abscess of the temporal lobe was not found, but there was extensive hemorrhagic softening of this lobe, corresponding exactly to the sensitive spot. Punctures with the scalpel showed that at one point the softening had already turned into suppuration. This purulent focus was discovered by mere good luck through a bead of pus on the blade after one of the punctures. In spite of an ensuing erysipelas the disease took a favorable course for a time. Later a prolapse of the brain appeared, and when this was removed with the Paquelin cautery an abscess, the size of a pea, was found in its centre. Whether this second focus of suppuration was not brought about till afterwards by the intercurrent erysipelas, or was present from the beginning, cannot, of course, be positively determined. But so much may be said quite definitely, that this small abscess could

not have produced all the severe cerebral symptoms, which evidently were caused by the extensive encephalitis.

This case teaches us that the early appearance of focal symptoms (in this case aphasia) cannot be considered as pathognomonic of a *non*-purulent hemorrhagic encephalitis; as in the hemorrhagic form of the disease, pyogenic germs may have entered and, therefore, an operation might save life.

CASE 3.—A woman, fifty-five years of age, had suffered for a week from severe pains in the right ear and on the right side of the head. Her speech was peculiar owing to marked trismus and she could separate her teeth only $\frac{1}{4}$ cm. Some tenderness over mastoid, right membrana tympani much congested and dull. Hearing lost, temperature 100.2° F. Paracentesis was deferred to the next day when the patient was to enter the hospital. She did not return until three weeks later and then was in a moribund condition.

The autopsy showed the articulation of the inferior maxilla to be normal. The dura was adherent to the pia in many places. Considerable œdema of the latter over the parietal lobes. On the lower surface of the right temporal lobe there is a yellow and softened spot in the cortex, the size of a twenty-five-cent piece.

The disease in this case being on the right side there was, of course, no aphasia. Whether the rigidity of the jaw was of central or peripheral origin further observations must teach. This patient died in consequence of encephalitis following her ear trouble. I leave the question open whether an early operation might have saved her life.

I am inclined to consider the three cases described here as three stages of one and the same disease, and not to place the hemorrhagic non-purulent form into a class by itself. From this it follows that I consider an operation indicated in these cases also—that is to say, of course, only when the encephalitis is dependent upon a suppurative otitis media. This question can only be cleared up by further publications, and to aid in this was, indeed, the main purpose of my contribution.

REPORT OF THE TRANSACTIONS OF THE OTOLOGICAL SECTION OF THE NEW YORK ACADEMY OF MEDICINE.

MEETING OF MARCH 12, 1903. THE PRESIDENT, EDWARD B. DENCH, M.D., IN THE CHAIR.

Presentation of Cases.

Dr. TOEPLITZ presented a case of **perichondritis**. The illness began six weeks ago with pain in the ear. A diagnosis of sub-acute otitis was made and paracentesis was performed. Pain shortly after developed at the anterior meatal wall. Later, the whole tragus became swollen, and it was again incised. Notwithstanding, the swelling and infiltration proceeded backward and below, occupying the lower part of the concha. Incision was made through the cartilage extending below the auricle and a compressive bandage applied.

Subperichondrial abscess cured without deformity.

Dr. H. KNAPP presented a girl of five years, having been under his care for the above affection. When first seen, January 22, 1903, the cartilaginous walls of the concha, including the crus and spine of the helix, were swollen and bluish, under the spine fluctuating. The calibre of the ear canal was narrowed, containing thin pus. The child had suffered from otorrhœa for a month; the palatal and pharyngeal tonsils were swollen. Dr. Knapp, making the diagnosis of a perichondritis consequent to the acute purulent otitis media, incised the posterior wall of the cavum conchæ and the lower wall of the spine of the helix. Thick pus escaped, not the thin, flocculent liquid seen in chronic perichondritis. Probing discovered an extensive abscess cavity, whose cartilaginous wall was smooth and firm, extending to the osseous portion of the ear canal. Using the probe as a director, he split

the postero-inferior meatal wall in its whole length, and scraped the cartilaginous wall with a small sharp spoon, in order to leave no degenerated parts in the wound. The cavity was carefully wiped, and then packed with sterilized gauze. The ear canal and tympanic cavity were thoroughly wiped with absorbent cotton, the ear bandaged, and the patient kept in the hospital until the next afternoon. There being neither pain nor discharge and the tampon being dry, the patient was sent home without changing the dressing.

Four days later she came again: no pain, no discharge, the tampon, though soaked with dried secretion, perfectly inodorous, and the ear free from secretion and pain; the dressing was left in place, and the patient sent home again. In a week she returned, and as all signs of inflammation had disappeared the tampon was removed; this was done without pain or blood, the wound being dry, as if it had been exposed to the air for a week.

Two weeks ago, that is, about six weeks after the operation, I examined her again. The auricle was healthy and in good shape. The ear canal was normal, the membrana tympani entire, somewhat dull, the hearing good.

Dr. Knapp said that this case had given him great satisfaction. He has considered the affection one of perichondritic abscess induced, as in most cases, by purulent otitis media and furuncles. The bluish, lustrous swelling was the same as in the degenerative perichondritis, which runs such a protracted course and leaves so hideous a deformity. He is inclined to believe that this calamity was spared his little patient by the early exposure, cleansing, and sterilizing the whole diseased area.

Discussion.—Dr. LEDERMAN spoke of a case of perichondritis coming on after frost-bite. Considerable of the cartilage was found diseased. Incision was made on both sides and a strip of iodoform gauze was passed through the auricle. The case healed completely, without deformity.

Dr. W. H. HASKIN presented a case in which **iodoform poisoning** had complicated the healing of a mastoid wound. The patient, a child of four, had had two simple mastoid operations performed. During the after-treatment of the second one, meningeal symptoms were very well marked. The child recovered and later suffered from a reinfection of the mastoid, necessitating another operation. The mastoid process was curetted and granulations were removed from the middle ear. The subsequent course was

unusual, inasmuch as fever arose two weeks after the operation and persisted for a number of days without anything to account for it in the wound. The doctor was about to operate again, when, instead of iodoform gauze being used in the dressing, plain gauze was applied—with the result that on the following day temperature had fallen to normal.

Dr. LEDERMAN inquired whether the urine had been examined for iodine. Answer, "No."

Dr. HASKIN said that he had endeavored to ascertain whether the meningeal symptoms after the second operation could possibly have been explained by the susceptibility of the child to iodoform.

Dr. HARMON BROWN replied that he had had the child in charge and that plain gauze had been used.

The next case presented was a **natural exenteration of the middle-ear cavities.**

Dr. DUEL presented this patient for Dr. BERENS: A young woman who had suffered for ten years from otorrhœa. She had visited the Manhattan Hospital on account of the loss of hearing. On examination, a defect was found in the posterior bony wall, and the middle ear, attic, and antrum were perfectly exposed without any ossicles, just as if a perfect radical operation had been performed.

Discussion.—Dr. HASKIN had recently removed some granulations in a suppurating ear and had then found the outer wall of the attic defective, exposing the ossicles in position.

Dr. DENCH recollected two cases where nature had exposed the bodies of the ossicles and where the articulations were distinctly visible.

Dr. JOHN GUTMAN presented a patient who had been operated on for a large **epidural abscess** after acute otitis media.

At the beginning paracentesis did not relieve the symptoms. The headache, rigidity of head, and tenderness along the posterior mastoid margin, with a temperature of 103° , persisted. Operation was urged but refused by the relatives until the condition of the patient had become very much worse. At operation, the entire mastoid process was found disintegrated. A fistula led back to a large epidural collection, exposing the dura of the cerebellar fossa. This dura was covered with granulations, which were removed. The sinus could not be recognized, and it is supposed that it became obliterated by the purulent process. The girl made an uninterrupted recovery.

Dr. LEDERMAN presented a case of **microtia**.

A child two and one half years old, microcephalic and deformed head. Both auricles are rudimentary; there are no auditory canals. The child apparently hears. Dr. Lederman asked the opinion of the Section as to whether anything should be done for cosmetic purposes, and at what time, as in these patients the canal is usually absent and the middle ear is defective in its anatomical construction though the labyrinth may be intact.

A brief consideration of the prognosis in chronic suppurative otitis, based on the results of a year's treatment in such cases. By THOMAS J. HARRIS, M.D.

Dr. HARRIS placed the following questions:

1. What is the future as regards the cure of the patient suffering from chronic discharge of the ear?
2. What chances has he for the relief of his symptoms along conservative lines of treatment, and what risk is he running of sooner or later suffering from fatal complications?

Dr. Harris has examined the suppurative cases for a period of eighteen months, in the service of Dr. Phillips at the Manhattan Eye and Ear Hospital. These cases have all been recently re-examined. Of over 100 cases observed, 50 attended regularly. All minor operations, principally for adenoids, extraction of polypi, and granulation tissue were first performed. Then medicinal treatment was begun. The total number of cases treated was 66. Forty of these were discharged cured at the end of from one to six months, 15 greatly improved, 11 not improved. Of the 40 cases reported cured, 5 were cases of acute exacerbation and are not included. Of the 35, subsequent examination at the end of the year was made in 20, of which there were 2 cases of relapse. Of the 11 cases not improved, the radical operation had been advised and refused in 4. In 88% improvement or a cure was secured. The cured and improved cases were treated by various medicines, including hydrogen dioxide, formalin, boric acid with alcohol. A weak formalin solution, ten to twenty drops to a quart of hot water, has served well in the irrigating of the ears. The syringing was followed by instillation of hydrogen dioxide in full strength. The danger in the use of the latter remedy is not recognized by the writer. The treatment was concluded by thorough dry cleansing, which was repeated two or three times a day. In cases of slight secretion, the dry treatment was employed and the instillation of the

boric acid in alcohol drops. In the presence of a greater amount of granulation tissue, in addition to curetting, chromic acid and nitrate of silver were employed. The nose and throat were treated, and in children the general health was improved by tonics. The writer believes that this form of treatment should be persisted in for weeks or months, and that the usual time of two to three weeks is altogether too short. The average time of treatment for the cases which he reported was from two to three months. If after this time the discharge is not controlled the question of operation comes up.

The writer thinks that a conservative note should be struck in the present era of aural surgery, and that the protecting wall of nature is amply sufficient. He does not think that a slight otorrhœa without other symptoms is sufficient to demand it. The writer draws attention to the comparatively large percentage of patients whose hearing is impaired after the radical operation. He also cites two fatal cases occurring in the practice of aural surgeons during the past year. The complete cessation of the discharge is not always assured.

Facial paralysis is becoming alarmingly frequent; though it generally clears up, it is nevertheless very disagreeable and may occasionally be permanent. A lasting cure is not always obtained; a healed cavity may subsequently become reinfected. The importance of operation in presence of intracranial complications, of course, is not to be doubted by any one; at the same time, that chronic otorrhœa *per se* without other symptoms is an indication for a radical operation is open to question, and to regard every case of suppuration as "a slumbering volcano or a charge of dynamite," is extreme. The exceedingly small proportion of autopsies where death has been due to an intracranial otitic lesion makes this point clear. Again, it must not be forgotten that loss of hearing does not infrequently follow operation, as recent statistics have shown. Comparing the relative proportions of cures from ossiculectomy to those obtained by radical operation, the results of the two methods seem to be about the same, while the interference with hearing has been very much less in the former than in the latter procedure.

Conclusions.—1. Chronic otorrhœa in a large percentage of cases is amenable to suitable medicinal treatment.

2. In addition to proper attention to disease of a general character and to the naso-pharynx, peroxide of hydrogen, with or

without formalin solution, gives the best results, all minor operative procedures, of course, first being attended to when necessary.

3. The results of such treatment are in a good number of cases permanent.

4. The risk of an uncured otorrhœa with good drainage is relatively very small ($\frac{1}{3}$ of $\frac{3}{4}$ % of fatalities).

5. Medicinal treatment failing, after a suitable interval of time, the danger of fatal complications in absence of all symptoms should be laid before the patient and the promise of relief by operation stated.

6. Where there is no good reason to the contrary, such as intracranial or mastoid complications, the intratympanic method by ossicectomy should be preferred, because: its results as regards cure are equally good; the risk of loss of hearing is vastly less; the danger of unpleasant sequelæ, such as facial palsy, is avoided; the possibility of prolonged after-treatment is obviated.

7. The radical operation is not without risk of life.

8. Where ossicectomy fails or mastoid or other symptoms exist pointing to extension of the disease into the bone, it then becomes the suitable and valuable method of relief.

9. The protecting and assisting power of nature is never to be lost sight of.

Discussion.—Dr. PHILLIPS thought it very difficult to define the exact time for operation in chronic otorrhœa—in other words, when the conservative treatment should be given up as useless. The radical operation is to be resorted to only as a final means.

Dr. HERMAN KNAPP thought that the constitutional side of the patient should not be lost sight of, and especially diabetes and tuberculosis.

Dr. HASKIN had looked over the statistics in the clinic of Dr. Clemens and Dr. Duel, and found that, out of 207 cases of chronic suppuration during the past three years, a partial Stacke was performed in 2, ossicectomy in 2, and radical operation in 7. In the others, the treatment had been conservative, by various medical applications and use of the attic syringe. He had been able to re-examine a considerable number of these patients and had found that 111 were cured.

Dr. LEDERMAN thought that the indication for operation depended on the local conditions, and that we should be careful in removing granulations, as they are often nature's safeguard.

The methods which he employed were about the same as had been mentioned by the reader of the paper.

Dr. TOEPLITZ thought that one of the fatal results following radical operation, as mentioned in the paper, was probably his; and he wished to say that it was a very unfortunate occurrence and seemed to be due to an infection with erysipelas, which complicated the healing process, and it had given rise to a temporo-sphenoidal abscess and meningitis.

Dr. DUEL thought that the question of the preservation of the function was, of course, of great importance, but, at the same time, it did not enter into account when the patient's life was in danger, and he thought that the danger to the patient should be the first indication for operation.

Dr. MEIERHOF thought that the indication for the operation generally depended upon the conditions present—bone fistulæ, a narrow canal, or, in short, those conditions that interfere with proper access by ordinary measures. He thought that the cause was also important, because we know that the caries resulting from scarlet fever is very much more extensive and obstinate to overcome by treatment than any other. He thought that the value of the paper would have been enhanced if the aural conditions had been stated by the reader.

A paper on **variations in the depth of the antrum**. By Dr. P. D. KERRISON (published in full on pp. 171–176 of this number).

Discussion.—Dr. TANSLEY said that we usually learn more by our mistakes than in any other way; he reported having followed Broca's directions. He proceeded through the square described by this author, and in a very short time directly encountered the lateral sinus.

Dr. ARNOLD KNAPP thought that the landmarks on the external surface of the mastoid were not so reliable as remembering that the antrum can always be encountered by proceeding at the junction of the superior and posterior wall of the canal in a line parallel to the canal. He also thought that the danger of injuring the facial nerve from the antrum was exaggerated; it was liable to become injured in cases of neoplasm of the mastoid, or in cases where, after the mastoid process has been completely removed, the operation is extended in endeavoring to expose the jugular bulb.

Dr. PHILLIPS believed that five eighths of an inch should be considered the depth of the antrum from the surface. He always in operating regards the linea temporalis an important landmark.

In one or two instances he had exposed the temporo-sphenoidal lobe below the central portion of this landmark, so that in teaching he had always recommended the operator to confine his original opening to a section below this line. He had lately been more inclined to rely upon the spine of Henle in opening the antrum, always keeping close to the posterior border of the spine, but the suprameatal triangle should not be ignored.

Discussion of Dr. Kerrison's Paper.—Dr. LEDERMAN said that the mastoid antrum is most frequently found in the area mentioned by the reader of the paper. In narrow mastoids we should anticipate meeting the lateral sinus farther anteriorly. Only recently he found the sinus resting almost against the posterior wall of the canal, occupying, as it were, the region of the mastoid cells. In this case the dura dipped below the superior wall of the canal, and both structures were diseased from a chronic suppurative process of the middle ear. In such patients serious complications arise quickly, and extend rapidly.

During a Schwartze-Stacke operation the antrum was hidden by the dura from above and the lateral sinus projected forward, so that the posterior wall of the canal had to be removed before the antrum could be reached without damaging these tissues.

The "probe" is an important guide in ascertaining the position of the antrum in mastoid operations.

Dr. DUEL thought that while an anatomical work of this kind was very important, for the purpose of clarifying literature of evident mistakes, the facts nevertheless would not prevent the inexperienced or careless operator from going wrong. In other words, that with a fixed depth in his mind an operator might in some instances stop short of the antrum; and, in others, go too far if he were going in the wrong direction. The important thing was that the operator should have an abiding faith in the presence of the antrum always in the same place, viz., beneath the angle made by lines drawn tangent to the superior and posterior portion in the circumference of the bony canal wall, and that he should go ahead in this direction, irrespective of how deep, until that cavity was encountered, that in this position he would seldom expose the sigmoid sinus in going in to the antrum, and that in the rare instance in which this might occur it would be necessary to approach the antrum by removal of the postero-superior portion of the bony canal wall after separating the cartilaginous canal.

MEETING OF APRIL 2, 1903.

I. Paper: **The symptomatology and diagnosis of the complications of chronic middle-ear suppuration.** By T. PASSMORE BERENS, M.D.

Dr. BERENS, after giving the definition of chronic purulent otitis and the pathological changes which usually occur, described the various modes of extension of the infection, which depend to a great extent on the anatomical conditions in the temporal bone. The complications which are the result of these extensions were treated in detail under the following headings: Extradural abscess, meningitis, sinus thrombosis, and brain abscess. The occurrence, symptoms, and course of each of these conditions were carefully described.

II. Paper: **The treatment of the complications of chronic middle-ear suppuration.** By JAMES F. MCKERNON, M.D.

Dr. MCKERNON took up the treatment of the conditions in the order of their frequency. Leaving out the technique, he briefly described the local treatment of the middle ear, laying due weight upon the importance of treating the nose and the nasopharynx in all chronic suppurative conditions of the middle ear.

The treatment of acute mastoiditis was given—both the medicinal and the operative. The Doctor warns against the use of cold or heat if the case is of several days' duration, and he believes in the value derived from a bacteriological examination of the pus. As regards operation, the mastoid tip should always be freed and removed. The first dressing is made painless by the use of a sterilized piece of rubber tissue with holes, which is inserted into the bony cavity and then filled with gauze.

In all cases of periosteal abscess, the mastoid process should be opened. In the writer's experience of thirty-one cases of subperiosteal abscess in children, pus was found in the mastoid in thirty. The treatment then described was of adenitis and pachymeningitis.

In sinus thrombosis, exploratory incision of the sinus with the scalpel is advised. Too much manipulation should not be practised to restore the flow of blood from the jugular bulb, lest septic particles be released into general circulation. It is best always to expose the lower end of the sinus as near the bulb

as possible, as there the trouble is more apt to be situated, rather than at the upper knee. This is possibly due to the proximity to the tympanic cavity, especially when an unusually large jugular bulb is present. If the sinus contains a disintegrated clot or pus, the internal jugular vein should be resected immediately. This step begins by ligating the vein at the clavicle, resecting the vein up to its commencement at the bulb, and ligating all the tributary branches. The wound is closed by continuous silk sutures and a rubber-tissue drain is inserted at the lower angle. After an operation of this kind the temperature may remain high for a few days, although the case is progressing satisfactorily, owing to the previous absorption of the septic poison into the system.

In discussing the treatment of brain abscess after incising the dura, the dural flaps can be held apart by silk sutures. The writer prefers the scalpel and the finger for exploring the brain. The cavity can be cleansed by gentle irrigation with a warm salt solution or gentle mopping. Drainage can be accomplished either by tubes or gauze wicks, the latter being preferred. The importance of looking for multiple abscess-cavities is mentioned.

Little or nothing is to be gained by surgical means in the treatment of meningitis. Large doses of iodide of potash can be given internally. In metastases of the intestine, large doses of bichloride of mercury should be given, with frequent flushing of the colon with a saline solution of warm boric acid. The writer has seen three metastases of the intestinal tract brought to a favorable issue under this method. As regards facial paralysis, the Doctor is inclined to think that it often results from the inflammation of the chorda-tympanic branch extending into the main trunk. In the treatment, the interrupted galvanic current has given the best results. Suturing the spinal-accessory nerve has not been satisfactory. The medical treatment of labyrinthal involvement is described and the usual methods of treatment advocated.

In conclusion, the author states that he believes the number of cases of chronic purulent disease, with their complications, will steadily grow less, as the acute otitis cases will be recognized more early and appropriate treatment instituted.

Discussion : Dr. ABBE spoke of the great importance of early operation. He said it had been very interesting to him to observe how in the last thirty years certain changes had taken place in the practice of surgery. One of these was the great diminution or

disappearance of erysipelas; another, the diminution of pyæmia. The pyæmia to which he refers is the one which formerly was seen following otitis and appendicitis. Otitis cases now being operated on early, pyæmic cases are rare. He thought, as regards appendicitis, that in the last five years a great change had taken place. At the same time, these pyæmic cases, though very grave, do unusually well. He thought that the jugular vein should be operated on first. Some cases of meningitis seem to get well, and it appears to him that the conditions are similar to those in other serous cavities, inasmuch as a certain amount of toxic absorption can be recovered from. He thought it very important to emphasize (especially for the general practitioner) that we should not wait for external mastoid symptoms, as these frequently do not appear at all, owing to the elongated condition of the bone. As regards closing the wound, he thought that that was against surgical teaching, and he was able to obtain as good a cosmetic result by approximating the granulating surfaces by strapping. At the same time, there was no risk of any infection.

Dr. LESZYNSKY thought a question of some interest was: When should the neurologist be called in to see an ear case? Surely not during the stage of coma. He was firmly of the belief that if the case were studied earlier, conjointly, by the neurologist and the otologist, the diagnosis could be furthered. Unquestionably, the intracranial complications are now comparatively rare, and their diagnosis is often very difficult. Small abscesses may not give any characteristic symptoms at all. Statistics are of no value at the bedside. The Doctor cited two cases which he had recently seen where a correct diagnosis had not been made. In the second, the brain was explored in various directions; no pus was found, and at autopsy a tumor of the pons was found present. He thought that the differential diagnosis between meningitis and abscess may be extremely difficult, because the latter was frequently complicated by the former. The slow pulse is characteristic of an abscess, though it may occur in meningitis. Rigidity of the neck is sometimes present in cerebellar lesions. Serous meningitis can often not be diagnosticated; if the case gets well, it is customary to speak of it as "serous meningitis." Lumbar puncture is of but little assistance, and this step is not without danger. The Doctor was decidedly against indiscriminate exploration of the brain as sometimes practised by otologists. In regard to facial paralysis,

he had seen no advantage from the use of the interrupted current; if in the second week there was an absence of Faradic irritability of muscle and nerve, he thought the question was an open one whether the power would be regained.

Dr. GRUENING wished to call attention to the anatomical formation of the temporal bone and its influence on the course of disease. He showed a specimen where the jugular bulb was unusually large and not only occupied the floor but encroached upon the medial wall of the tympanum. As dehiscences are not uncommon, a case of this kind could easily show signs of pyæmic infection. He also spoke of cases where certain cells in the mastoid become involved and remain diseased while the rest of the process gets well. He referred especially to the cells in the tip. He thought that the anatomical conditions were of much greater importance than the kind of bacilli found present.

Dr. WENDELL G. PHILLIPS thought that if the acute cases were properly treated the chronic cases would not occur. If the chronic suppuration is complicated by mastoiditis, an operation should be performed. He thought that knowledge gained from the bacteriological examination was a very serviceable clue to the proper treatment in acute cases. In conclusion, he wished to enter a very warm plea for early operation in acute mastoiditis. Temperature in adults is of very little diagnostic value. In his experience, meningitis was always fatal, and all operative measures were needless.

REPORT OF THE TRANSACTIONS OF THE NEW YORK OTOLOGICAL SOCIETY.

BY DR. ARNOLD KNAPP, SECRETARY.

MEETING OF MARCH 24, 1903. DR. J. B. EMERSON, PRESIDENT,
IN THE CHAIR.

Presentation of Patients.

Dr. DUEL presented a case of **secondary operation**. The patient had been operated upon by Ballance, of London, eighteen months ago. The case was one of otorrhœa since childhood, and the usual procedure, as described by this author, was followed. Dr. Duel stated that Ballance now has changed his method of operating, and simply splits the canal without removing any of the cartilage in the plastic step of the operation. The patient came to the Manhattan Eye and Ear Hospital five months ago with recurrence of the otorrhœa. The canal was found considerably stenosed. After two months of conservative treatment it was decided to operate. After detaching the auricle, a soft mass, covered with a thick membrane, was encountered, which came from the middle cerebral fossa and was as large as the ball of the thumb. It could be pushed back; there was some necrosis of the cavity and the facial ridge had not been sufficiently levelled down. The cavity was thoroughly curetted and the skin flap was taken by dissecting off the skin from the anterior wall of the canal and the cavum conchæ. This was then thrown up so as to cover the protruding mass; the cartilage was thoroughly removed, the wound was covered at subsequent operations by skin grafts. Then the case was free from symptoms and now is healed except at one small point in the tympanum.

Dr. HARRIS presented some **drainage gauze tubes**, as devised by Dr. Jack of Boston. These tubes consisted of thin rubber finger-cots which come in a number of sizes. Their principal object is to relieve the pain of the first dressing. According to Dr. Jack, the mastoid incision is partially closed above and below, and this rubber tube is passed down to the depth of the wound and then filled with gauze, which remains in place for twenty-four hours.

Voluntary Contributions.

Dr. QUINLAN spoke of a case of **congenitally deformed auricle** upon which he had just performed an operation. The auricle was prolapsed. Darwinian tubercle was very well typified, the ear not only stuck out, but was pointed, and the deformity was unusually marked. A posterior incision was made, the skin was dissected from the auricle posteriorly, and this was pulled up and attached by deep tension and superficial sutures. The auricle is now close to the side of the head and the result is very satisfactory as far as it is possible at present to determine.

Dr. QUINLAN also spoke of a child five years of age upon whom he had performed a **double mastoid operation**. Four weeks ago the child was admitted to St. Vincent's Hospital. Temperature was high and septic symptoms were pronounced. No cause could be found, though there was some discharge from the ear; Shrapnell's membrane was bulging and the mastoid tip was somewhat tender. At operation the cortex was found apparently healthy, but the entire internal structure of both mastoid processes seemed to be completely disintegrated; the temperature came down completely in about three and a half days; there was some history of a grippe infection.

Dr. HARRIS wished to ask the opinion of the Society upon the significance of *tenderness* along the *posterior margin* of the *mastoid process*. He recently had a case of otorrhœa of three weeks' standing without fever. The posterior margin of the mastoid was unusually tender; there was only slight sensitiveness over the antrum. At operation the antrum was found containing very little disease; the tip was broken down, and a cell situated deep down on the internal table was found full of pus.

Dr. SHEPPARD regarded pain in this locality as a very important symptom, and he thought that it was certain evidence of pus.

Dr. DUEL had seen this symptom associated with tenderness in other parts of the mastoid process.

Dr. LEWIS remembered two cases of tenderness rather far back at the masto-occipital suture. In one case an epidural abscess was found back of the sinus with a perisinuous abscess. The process in the middle ear in the case healed.

Dr. CLEMENS inquired whether the situation of the sinus in Dr. Lewis's case was normal.—“Yes.”

Dr. QUINLAN asked whether the sinus in Dr. Harris's case was exposed. Dr. Harris said it was not exposed, as there were no symptoms pointing to its involvement.

Dr. WILSON spoke of a man aged thirty whom he had first seen in 1897. There was a bluish tumor at the junction of the *Mt* and the posterior wall of the canal, measuring 9 *mm* vertically, 6 *mm* laterally, and projecting 2 *mm* into canal. It was apparently solid, extended outward on the posterior wall of the auditory canal for 10 *mm*, and evidently contained liquid. The patient disappeared from view; he was seen again in 1899. It was incised and a molasses-like fluid evacuated. The patient was not seen again until a week ago. The outer, incised part of the growth had disappeared, but a smaller mass containing liquid was left at the junction of *Mt* and canal. On incision, the same character of contents was let out. The fluid was examined; it appeared to be degenerated blood. Dr. Wilson thought that it was a hæmatoma, though he could not explain the reason for its occurrence in such a situation.

Dr. EMERSON inquired whether the sac had any lining, and whether it had been explored.

Dr. WILSON replied that it did not have a distinct lining.

Dr. FRIEDENBERG spoke of profuse, **persistent otorrhœa as an indication for the mastoid operation.** He had just observed a case where the otorrhœa had persisted profusely for three weeks. There were no other symptoms. The mastoid was opened and granulation tissue and caries were found, but no pus. The case has done well.

Dr. LEWIS inquired what the condition was of the drum membrane.—“There was a perforation in the posterior lower quadrant; the drum remained red.”

Dr. DUEL inquired whether there was any sagging of the canal wall.—“No.”

Dr. SHEPPARD remembered a case where otorrhœa had existed

for four or five weeks without any other marked symptom, and at operation he was surprised at the unusual amount of caries encountered.

Dr. CLEMENS inquired whether in Dr. Friedenbergs case the mastoid pain had previously existed.—“It had existed in the beginning, but not at the present time.” He thought that the pain in the mastoid process originated whenever the process extended to the periosteum or the meninges. Hence he thought that in a case of central disease the otorrhœa could persist without any pain in the mastoid process. He reported that the first case of this character which he had seen was very similar to the condition described by Dr. Sheppard. The outer layer of the mastoid was thin but healthy, while the entire interior was disorganized.

Dr. CLEMENS reported a case of double mastoiditis, where there were some mastoid tenderness and bulging drums, with profuse otorrhœa. After three weeks both mastoid processes were operated upon and were found completely destroyed.

Dr. SHEPPARD had observed a case of mastoiditis in a patient whom he had first treated for eczema of the canal.

Dr. FRIEDENBERG said that he had operated upon a patient according to the radical method for chronic otorrhœa two weeks ago. The facial spur showed no tendency to granulate. He desired the opinion of the Society as to the advisability of skin grafting.

Dr. DENCH said that he had been practising skin grafting frequently of late, and had been very well satisfied with his success after primary grafts. He said that Mr. Ballance was now also practising primary skin grafting, and that he made it a practice to remove his gauze packing on the third or fourth day, so as to remove the superficial layer of the graft. He thought that he thereby obtained healing more promptly. Dr. Dench seemed to think that the graft when applied directly to the bone took in most cases. As a dressing, he now employed pledgets of cotton, which were removed in eight days.

Dr. LEWIS said that he also had been practising skin grafting of late, and had at first been very much disappointed in the apparent sloughing of the skin graft, but found that it was only the superficial surface which sloughed, and that the process of healing was uninterrupted and the duration was very much shortened.

Dr. LEWIS spoke of the propriety of **removing adenoids during acute otitis**, and reported the case of a child between two and three years of age who had suffered from otitis for five weeks.

There was a profuse discharge due to streptococcus and pneumococcus infection. The membrana tympani was bulging, notwithstanding that paracentesis had been made three times. The supero-posterior canal wall was bulging. There was no mastoid tenderness. Temperature was 100.4° . He wished to know the opinion of the Society as to whether, under these conditions, it would be proper to remove the adenoids now or wait, or whether it would not be better to open the mastoid cells.

Discussion. — Dr. QUINLAN said that the same question had been brought up some years ago at an otological meeting, and he thought it was a very important one. He remembered having seen three cases where the ear condition had been made worse by the removal of the adenoids, and the mastoiditis seemed to have been augmented. He thought it wiser to wait until the acute symptoms had subsided.

Dr. DUEL said that in his experience the early removal of adenoids had given him only good results, and that he was in the habit of removing the tonsils and adenoids when doing the paracentesis.

Dr. FRIEDENBERG reported a case of otitis of four weeks' standing with muco-purulent discharge. This would cease, and at the end of five or six days there would be a fresh onset. He purposed removing the adenoids and performing a large section of the drum membrane.

Dr. DUEL stated further, that in mastoiditis it was his practice to remove the adenoids and tonsils at the same time with the mastoid operation. He had seen only good results come of this practice.

Dr. GRUENING had recently seen a small boy with a temperature of 103° . The mastoid was involved and adenoids were present. He thought that ordinarily the adenoids could be removed at a later time, and not in the presence of fever or any threatening complication.

Dr. DENCH would not operate for the removal of adenoids while fever lasted.

Dr. TOEPLITZ had seen a child of three years with otorrhœa where the adenoids had been removed. Temperature rose to 103° and remained high for four days. It then came down and the otorrhœa ceased.

Dr. GRUENING did not think that the adenoids had anything to do with the mastoiditis.

Dr. QUINLAN thought that as the adenoids were known to be a source of many of the ear infections, it would be better to remove them in a large percentage of cases.

Dr. SHEPPARD removed the adenoids in a patient while there was an epidemic of grippe in the house. The patient contracted pneumonia and died. The operation had been held responsible for the fatal result, and he was against operating during complications.

Dr. FRIEDENBERG thought that a feature not to be forgotten was, that as loss of blood is badly borne by children, the adenoid operation should not be performed if the mastoid operation has been severe.

Dr. DENCH reported a case of **catalepsy occurring in otitic meningitis**. Two weeks ago he operated at the Infirmary for acute otitis with mastoid involvement. Paracentesis was performed; temperature relieved. Later the mastoid tip became very tender. At operation the antrum was found normal, the tip involved. A perforation was present inwards toward the digastric fossa and posteriorly into the cerebellar fossa, producing an epidural abscess. The sinus was exposed, found thrombosed; the internal jugular was resected. For six days the patient did well, then he became apathetic, with slow pulse, double optic neuritis, and catalepsy.

Dr. DENCH thought that he had to deal either with a cerebellar abscess or with meningitis. The cerebellum was exposed and the fourth ventricle was accidentally tapped. The patient before the last operation developed a very marked form of catalepsy. This was less marked after the intracranial pressure was relieved.

Dr. McKERNON spoke of a woman of forty-one upon whom he had operated for chronic otorrhœa by the Stacke method. She did perfectly well for six days, and then suddenly developed a **double facial paralysis** and had difficulty in swallowing. The reaction with the electric battery was normal, and the Doctor thought the condition due to hysteria and gave a good prognosis. Paralysis on the right side cleared up after thirty-six hours, and on the left side after seventy hours.

REPORT ON THE PROGRESS OF OTOTOLOGY FOR THE THIRD AND FOURTH QUARTERS OF THE YEAR 1902.

BY DR. A. HARTMANN, BERLIN.

Translated by Dr. ARNOLD KNAPP.

ANATOMY OF THE EAR.

152. **Alexander, C.** On the pathologic histology of the aural labyrinth, with special regard to the organ of Corti. *A. f. O.*, vol. lvi., p. 1.

152. The patient was a laborer, sixty-six years old. He died from carcinoma of the tongue. During the last two years he had become progressively deaf. The day before his death his hearing was found to be $\frac{8}{10}$ and $\frac{8}{10}$. Microscopic examination revealed a normal external and middle ear and marked atrophy of the organ of Corti, mucoid degeneration of the spiral ligament, and atrophy of the spiral ganglion of the cochlear nerve—in short, an affection of the membranous cochlea and of the cochlear nerve, without involvement of the rest of the labyrinth, and with intact labyrinthine windows. Three stages of atrophy were determined in the organ of Corti: *first*, circumscribed disappearance of the sensory epithelium in normal surroundings; *second*, defect of the sensory epithelium, with associated increase of the supporting cells; *third*, complete atrophy of the bacillary papilla. In place of the atrophied sensory and supporting cells, there was squamous epithelium.

The etiology was supposed to be marked arterio-sclerosis and, possibly, a cancerous cachexia. HAENEL.

PHYSIOLOGY OF THE EAR.

153. **Frey, H.** Experimental study on the transmission of sound in the skull. *Zeitschr. f. Psych. u. Phys. der Sinnesorgane*, vol. xxviii., p. 9.

154. **Meyers, C.** On the pitch of Galton whistles. *Journ. of Phys.*, vol. xxviii., p. 417.

155. **Hammerschlag, V.** The location of the reflex centre for the tensor tympani muscle. *A. f. O.*, vol. lvi., p. 157.

156. **Zimmermann, G.** On the mechanism of hearing. *Münch. med. Wochenschr.*, 1902, No. 50.

153. The question as to the way by which the sound waves reach the labyrinth is still quite unsettled; we know very little regarding the transmission of sound waves in bone. The author has endeavored to study this subject, and especially to investigate the sound conduction in bone. He puts the following questions:

(1) In what way is the sound transmitted in human bone, and what influence has the structure of the bony tissue on this process?

(2) How does the macerated bone compare with the flesh in this particular?

(3) How are the sound waves transmitted in the cranial bones? To what extent does this occur, and in what way?

(4) What differences are there in these phenomena in the macerated and in the fresh specimens?

The important part of the apparatus is the microphone. By the aid of this, in a series of investigations the kind of transmission was studied on a macerated and then on a fresh thigh bone. It was shown that the important factor for the transmitting ability in a bone depended upon its density and in the relative position of its bony parts. The compact bone, as a rule, transmits better than the spongy, with the exception of those bones where the spongiosa is of a firm density and where the compact portion has a very small diameter. This condition holds equally for the dry, macerated as for the fresh, moist bone.

The author then studied the transmission of sound in the head by means of a macerated skull and a fresh skull containing brain and all the soft parts. A tuning-fork was introduced in the auditory canal and adjusted to the promontory. The following results were obtained:

First.—The direction which sound waves take upon reaching the head depends principally upon the distribution of the bony substances, in regard to its density.

Second.—The sound waves emanating from the auditory canal of one side spread over the whole skull, especially to the symmetrical points of the other cranial half—in other words, to the opposite pyramid.

Third.—There exists, therefore, a transmission of sound from ear to ear by bone-conduction. This takes place only through the bony skull, without the sound-conducting chain coming into play.

Fourth.—These conditions are present in the macerated skull; they are not altered in the fresh skull, and can be regarded to hold true in the living head.

The end of this very interesting paper discusses theoretically binaural hearing and monaural conduction. The fact is brought out that, as the pyramids are the hardest bony masses, they are best able to receive the sound waves which strike the skull at any place, conducting them to the auditory organs and connecting the two.

DREYFUSS.

154. Experiments with Galton whistles modified by Hawksley. The author concludes as follows:

(1) In all varieties of Galton whistles the pitch varies with the amount of ear pressure employed. The variation is greatest in low pressure. (2) Increase of the air pressure occasionally produces a sudden lowering of the pitch. (3) There is a definite point in the upper auditory limit where a tone can only be heard at the moment when the air enters or leaves the whistle. These are the periods where the pressure is the lowest and sounds of the lowest number of vibrations are produced. (4) The whistle tone of 50,000 vibrations in the skull is not audible. The highest audible tone of the Hawksley-Galton whistle has 20,000 to 25,000 vibrations (young individuals).

DREYFUSS.

155. HAMMERSCHLAG determined in eight young cats, in whom he had divided the medulla oblongata at various levels, the location of the reflex centre for the tensor-tympani muscle, and has found the approximate boundary of the tensor tympani reflex region to be behind the corpora quadrigemina, and the distal limitation to be the peripheric end of the middle third of the fourth ventricle.

HAENEL.

156. In a meeting of naturalists ZIMMERMANN read a paper in which he endeavoured to meet the objections which have been made against his theory.

SCHEIBE.

GENERAL.

a.—REPORTS AND GENERAL COMMUNICATIONS.

157. Barth. The condition of the ear and of the upper respiratory passages in 275 recruits. *Deutsche militärärztl. Zeitschr.*, 1902, ix. and x.

157. The hearing was examined in a corridor, thirty-six metres long, in which a whisper is normally heard throughout the entire length. 59 % of the recruits had normal hearing, 25 % heard the whisper in 30 to 35 *m*, and 9 % in 20 to 29 *m*. In the last two groups, traces of old middle-ear disease were present in the form of cloudiness, scars, and deposits of lime in the drum membrane, though these were also found present in normal-hearing soldiers. In the presence of a perforation the hearing was always (though sometimes only slightly) reduced. In 7 % the hearing was below 20 *m*, as the result of severe chronic changes. For military purposes, the functional examination is not sufficient, because, even in the presence of a hearing power of more than 4 *m*, diseased conditions may exist in the ear, which will require discharge or treatment. The author concludes upon the importance of the associated treatment of the nose and the naso-pharynx.

ZIMMERMANN.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

158. **Stangenberg, E.** On the relation of diphtheria to ear diseases. *Nordiskt medicinskt Arkiv.*, vol. xxxv., Div. 1, No. 1, p. 4.
159. **Jurgens, E.** On the sensibility of the drum membrane. *Monatsbl. f. Ohrenheilk.*, 1902, No. 12.
160. **Bylsma, R.** On four cases of Ménière's symptom-complex. *Monatsbl. f. Ohrenheilk.*, 1902, No. 2.
161. **Wassiljew.** On the action of detonations on the function of the ear. *Wojenno medicinski Shurnal*, Nov., 1902.
162. **Sonntag, A.** On the pathology and anatomy of the temporal bone. *Monatsbl. f. Ohrenheilk.*, 1902, No. 11.
163. **Jurgens, E.** On the roll of the lymphatic glands in the neighborhood of the ear. *Monatsbl. f. Ohrenheilk.*, 1902, No. 2.
164. **Kretschmann.** Diseases of the maxillary articulation as the cause of nervous otalgia. *Arch. f. Ohrenheilk.*, vol. lvi., p. 24.
165. **Schade.** Migration of a nail from the naso-pharynx into the middle ear. *Deutsche med. Wochenschr.*, No. 44, 1902.
166. **Buyt et Villers.** Case of multiple sarcoma of the meninges, with extension to the two petrous pyramids. *Jour. méd. de Bruxelles*, 1902, No. 31.
167. **Massier.** Cardiac reflex of aural region. *Ann. des mal. de l'or., du lar.*, 1902, No. 10.
168. **Brod, S.** A case of objective tinnitus. *Wratschebnaja Gaseta*, 1902, No. 46.
169. **Alt, T.** On the disturbance of musical hearing. *Monatsbl. f. Ohrenheilk.*, 1902, No. 6.

158. The author has examined, during a period of seven years,

about 1000 cases of diphtheria, and has found ear disease in 243 (24.3 %), in which the connection with diphtheria seemed clear. The ear complication was most frequent in the ages up to five years, and between five and ten years—44.85 % and 32.51 % of the cases examined; very much less frequent in the older, 5 %-10 %. In 16 cases a neurosis was present with aural pain, without any objective reason. Aural tubal catarrh was present in 190 patients—binaural, usually. In 28 cases this passed into an exudative process. Tubal catarrh generally belongs to the early stage of diphtheria. The exudative middle-ear processes were present in 65 cases, including these 28. The inflammation is usually very mild and did not present any particular peculiarity. Paracentesis was made necessary in 8 cases. Spontaneous perforation took place in 20. These processes usually develop somewhat later in the course of the disease—second or third week. It seems probable that the disease was produced by transmission through the tube. The intensity of the diphtheritic process seems to stand in no constant relation to the occurrence of the ear disease. This may occur in very mild cases, or be present in very severe cases.

JORGEN MOLLER.

159. This is the examination of healthy persons and others suffering from ear disease, by testing the sensibility of the drum membrane and of the meatal walls with the probe. The author frequently found a diminution of sensibility without any apparent cause. Hyperæsthesia is more uncommon in purulent otitis media; in more than one-half the cases the sensibility was diminished, while it was increased in the acute catarrhal processes.

BRÜHL.

160. The causes of diseases were : first, tubal occlusion; second, severe sneezing after cold; third, an attack of glaucoma; fourth, excessive smoking. Recovery took place after catheterization, with the use of a miotic in the third case, and in the fourth by injection of pilocarpin and massage.

PIFFL.

161. The examination of soldiers took place six or seven hours after cannonading; 200 soldiers were examined who had stood next to the cannons during the shooting. Of these, 79 complained of various noises and stopping up of the ears. In many, a hyperæmia of the drum, of varying grades, up to the reddening of the entire membrane, was observed. Cloudiness of the drum membrane existed in a few. Hearing in many was reduced, more for high than for low tones. This disturbance of hear-

ing in all disappeared completely after three or four days. The shooting with smokeless powder seemed to have a more violent effect on the hearing than the ordinary powder, according to the testimony of the soldiers; there was no objective difference observed.

SACHER.

162. Three specimens are described. In the first two, a very marked defect in the jugular sulcus, with simultaneous high location of the jugular sulcus, so that the wall of the bulb was directly adjacent to the drum. In the third specimen there was bony ankylosis of the malleo-incudal articulation, with new bone-formation in the drum membrane and tympanic cavity.

BRÜHL.

163. Owing to the close relation of the lymphatic channels of the ear to the surrounding lymphatic glands and the varied etiology of their affections, the author decided that these glands are never independently affected; that their cause is generally in a disease of the middle ear; that inflamed glands may simulate a mastoiditis.

PIFFL.

164. KRETSCHMANN found a disease of the maxillary joint to be the cause of nervous otalgia in 20 out of 84 cases. This was always monaural, and usually rheumatic in nature. It can be easily overlooked, owing to the preponderance of the aural pain. The location of the pain in the ear can be explained either by incorrect localization or by a reflex irritation of the tympanic plexus.

Prognosis is good. Treatment consists in immobilizing the joint, applications of iodine, ichthyol, salicylate.

HAENEL.

165. A man nineteen years of age extracted a nail from a box with his teeth four years ago. He swallowed the nail, and suffered considerable pain in his throat for eight days. Attempts at extraction at that time did not succeed. Four years later, after a violent movement, sudden shooting pain set in in the left ear, and after three days the patient was able to extract out of the ear a nail 12 mm long, 1 mm thick, bent in the middle. In the following weeks, symptoms of severe otitis gradually disappeared.

NOLTENIUS.

166. A man, twenty-two years of age, grew completely deaf two years ago, with a number of other nervous disturbances: giddiness, headache, double-sided optic-nerve atrophy, paralysis of the left facial nerve, nystagmus, ptosis right, and diminution of intelligence. At autopsy three sarcomas were found at the base of the skull in the meninges. Two of these tumors had prolongations extending into the internal auditory meatus, which completely

occluded this passage and had destroyed the nerves and the surrounding bone. The cochlea was also affected by the tumor, but the vestibule, semicircular canals, and middle ear were intact.

RAU.

167. The disturbance consisted in cardiac palpitations which had existed for years in increasing frequency and which were not organic and could not be relieved by any treatment. The ears were examined, owing to the complaint of tinnitus. Inspissated cerumen was found present. After this was removed the cardiac disturbance disappeared gradually.

ZIMMERMANN.

168. A child eight years of age complained of a foreign object in the right ear. According to the relatives, this had been introduced three years previous. The patient was awakened at night by a pain and felt that something was moving in the ear. After lone week the pain ceased and a noise was heard in the ear. A physician examined the patient on the second day, but found no foreign object. The peculiar noise could be heard at some distance. It was of rhythmic character and recurred 132 times in the minute. It ceased on deep inspiration, when the mouth was kept open during Valsalva's experiment, and on air rarefaction in the external canal. When the patient was lying down, the sound was less noticeable, and not at all during sleep. Beyond retraction of the drum, no other anomaly. The author thought that the noise was caused by contractions of the tensor tympani muscle.

SACHER.

169. The disturbance of musical hearing produced by peripheral disease of the auditory organ, was the subject of this investigation. Seven additional cases are added to those found in literature. Experiments with tuning-forks were instituted after the production of an interference with the sound-conducting apparatus and after forcing inward of the drum membrane with the Siegle speculum. It was shown that of the various tuning-fork tones the deeper one could be made imperceptible by the increase of pressure, or that in the presence of heavy tones the fundamental tone would no longer be heard as soon as the increase in pressure took place.

As a result of these experiments, which the author regards as due to increased pressure within the labyrinth, a theory explaining various disturbances is formulated.

This very interesting paper should be read in the original.

PIFFL.

C.—METHODS OF EXAMINATION AND TREATMENT.

170. **Gutzmann, H.** On hearing exercises with the phonograph. *M. f. O.*, 1902, No. 8.
171. **Marage.** Scientific treatment of deafness. *Arch. internat. de laryngol., d'otol. et de rhinol.*, Juillet-Aôut, 1902.
172. **Bayer and Pennickx.** Static electricity in otology. *Journal médical de Bruxelles*, 1902, No. 39.
173. **Harris, Thos. J.** Prognosis of chronic catarrh of the ear. *Annals of Otology, Rhinology, and Laryngology*, August, 1902.
174. **Gomperz.** On improved hearing after suppurating otitis. *Arch. des mal. de l'or., du lar.*, 1902, No. 8.
175. **Bentzen.** On improving the hearing with the artificial ear-drum. *M. f. O.*, 1902, No. 1.
176. **Oaks, J. F.** On the use of hot air in Eustachian catheterization. *Laryngoscope*, Sept., 1902.
177. **Spiess, G.** Anæsthesin, the new, local anæsthetic, with remarks upon the routine action of anæsthesin. *Münch. med. Wochenschr.*, 1902, No. 39.
178. **Lehmann.** Adrenalin. *Münch. med. Wochenschr.*, 1902, No. 49.
179. **De Stella.** Report of the physical action and therapeutic use of adrenalin. *Bulletin de la société de médecine de Gand*, Sept., 1902.
180. **Taramasio.** Toxicology of adrenalin. *Revue médicale de la Suisse Romande*, 1902, No. 8.
181. **Escat.** Adrenalin in nasal surgery. *Arch. internat. de laryngol., d'otol. et de rhinol.*, Sept.-Oct., 1902.
182. **Schubiger-Hartmann.** Adrenalin. *Correspondenzblatt f. Schweizer Aerzte*, 1902, No. 21.
183. **Goldschmidt, A.** The use of adrenalin in the treatment of nose and throat. *M. f. O.*, 1902, No. 9.

170. The author recommends the phonograph for vocal training, to replace the hearing exercises, and especially in deaf-mute institutions. In one case, the patient was able to distinguish readily the vowels, by the hearing, with the aid of the phonograph. The author seems to regard the hearing exercises as of some value.

BRÜHL.

171. As massage of the drum may be injurious owing to the excessive excursion of the ossicular chain which it produces, the author has advised a vibratory apparatus, on the principle of the siren, which communicates to the stapes vibrations of the same character as those of an enunciated word. The fundamental vibration of the German vowels "u, a, o, e, i," serves at the same time to measure exactly the hearing power. The author has employed his apparatus in various forms of deafness, and the results which he accomplishes are truly remarkable.

RAU.

172. Treating the drum membrane with static electricity: Fifteen cases of deafness and partial tinnitus, usually produced by affections of the sound-conducting apparatus. An improvement in hearing and diminution of the noise were obtained. The accompanying case-histories do not, however, seem to be quite positive proofs of the author's statements. It seems that most of the affections were the subsequent conditions to chronic disturbances in the nose or naso-pharynx, where, as is well known, local treatment often produces a decided improvement of the symptoms. It is therefore not improbable that the improvement obtained was principally due to the preceding local treatment. RAU.

173. HARRIS believes that the progress achieved in the treatment of chronic catarrh of the ear has been small and our chief success rests in the ability to set aside the cause originating the nasal catarrh. Tubal therapeutics and pneumo-massage are at best only of temporary benefit and in the hands of some even harmful. Prophylactic measures are of greatest value, especially the early removal of adenoids. Naso-pharyngeal catarrh in every instance is capable of at least temporary cure by removal of some local cause, although the local cause may not turn out to be the real cause. Then we must look for it in some general dyscrasia, the removal of which is essential to success, although not possible in all instances. CLEMENS.

174. GOMPERZ speaks of the value of triacetic acid to close large perforations, and, in cases where this is unsuccessful, of the value of artificial drums. He has had good success with chemically pure silver and vaseline. In cases of adhesion between the malleus and promontory, these are to be released and to be kept separate by the introduction of celluloid strips.

ZIMMERMANN.

175. The author has examined seven ears with double defects of the drum membrane before and after the introduction of the artificial drum. The examination was with whisper, continuous-tone series, Galton whistle, Weber's and Schwabach's experiments. The results are as follows:

1. The hearing distance for whispering voice becomes greater.
2. The lower tone-limit descends.
3. The upper tone-limit remains.
4. The quantitative hearing power is increased.
5. The bone-conduction is usually enlarged.

Thus, it is seen that the artificial drum serves for the better comprehension of the conversational voice. The author has

observed, after a prolonged use of the artificial drum, a permanent improvement in hearing. PIFFL.

176. The apparatus described consists of a brass tube, around which is woven a coil of wire of high resistance. A packing of asbestos surrounds the coil, which is further encased in a brass tube of small dimensions. The distal end is in form of a metal tip, and the proximal end is made of black fibre. The heat generated by the high resistance wire causes the inner brass tube to grow sufficiently hot to heat the compressed air in its passage through it. A metallic catheter covered by hard rubber is used with no uncomfortable sensation of heat or burning to the patient. The catheter is of ordinary size and being flexible it can be bent almost as freely as a silver one. CLEMENS.

177. The difference in the action of cocaine and orthoform is discussed. That anæsthesin acts similarly to orthoform is, however, to be proved. It may be employed after operations to relieve pain, and it is supposed to favor the healing of the wound. It is of advantage in whooping-cough and acute coryza.

SCHEIBE.

178. After a prophylactic injection of 1 to 2 *ccm* of 1:1000 adrenalin solution in the livers of rabbits, small pieces of liver could be excised without hemorrhage. A marked hyperæmia set in after this without hemorrhage. There were no symptoms of intoxication. Thus far, no toxic action has been observed in man.

SCHEIBE.

179. The author reports on experiments with dogs and rabbits. After intravenous injection, the general action set in, even after 1½ *ccm* of the 1:1000 solution: excitement, then paralysis of the vagus centres. After the other method of application, the local action was the principal one. For operations in the nose, the introduction of the tampon soaked in a mixture of adrenalin and cocaine is advised. He thinks that thus the dangers of cocaine intoxication are also diminished. For operations in the mouth, adrenalin is to be injected in the tissue. It is also of service in the mastoid operations. No severe after-hemorrhages have been observed.

RAU.

180. After numerous experiments on animals, the author finds that adrenalin in subcutaneous injections is fatal for rabbits in a dose of 0.02 gram per kilogram, in some cases 0.004 gram. Corresponding doses in the guinea-pig varied between 0.01 and

0.004 gram. Death resulted in less than one hour from acute œdema of the lungs, with dyspnœa, fall of temperature, diminution of sensibility of the reflex and the voluntary motion. In the frog, a dose of 0.5 gram per kilogram is always fatal. RAU.

181. ESCAT always employs a mixture of adrenalin and cocaine. He thinks this is contra-indicated in some diseases: in cases of adrenalin intoxication, syncope (cerebral anæmia). Careful packing after operation is indicated to prevent after-bleeding. RAU.

182. The authors have employed adrenalin in acute empyema after coryza. It was introduced on pledgets of cotton and relieved the symptoms. The removal of polypi from the middle ear is always aided by the previous use of adrenalin. RAU.

183. This author has tested the hæmostatic action of adrenalin, and has found that it serves in acute epistaxis, as well as to prevent bleeding after operations. BRÜHL.

d.—DEAF-MUTISM.

184. **Hammerschlag, Victor.** A new subdivision of the various forms of deaf-mutism. *A. f. O.*, vol. lvi., p. 161.

184. The objections to the present classification are:

1. The previous subdivision into congenital and acquired is not grounded on pathological or clinical differences.
2. Pronounced congenital forms of deaf-mutism may appear under the clinical picture of acquired.
3. Acquired deaf-mutism may be acquired intrauterine.
4. Endemic deaf-mutism cannot be grouped in either of these subdivisions.

A new classification is suggested. The author differentiates between (1) the deaf-mutism caused by local disease of the ear, and (2) constitutional deaf-mutism. The former is always acquired, usually in post-fœtal life; the latter, just as the constitutional anomaly of which it is the rudiment, may be acquired or congenital. In the second group, the endemic are separated from the sporadic forms. HAMMERSCHLAG thinks that pathological research will succeed in finding characteristic marks for each one of these new forms. The observations are based on the research of Bircher. New investigations not made. HAENEL.

EXTERNAL EAR.

185. **Broeckaert, J.** Endothelioma of the auricle. *La Presse otolaryngologique Belge*, No. 8, 1902.

186. **Pooley, Thomas R.** Epithelioma of the auricle and auditory canal. *N. Y. Med. Jour.*, July 26, 1902.
187. **Jürgens, E.** Three cases of congenital auricular atresia with microtia. *Monats. f. Ohrenheilk.*, 1902, No. 7.
188. **Lamann, W.** On pressure packing in furuncular otitis externa. *Monats. f. Ohrenheilk.*, 1902, No. 6.
189. **Wissiljew.** Circumscribed external otitis. *Wojenno medicinski Shurnal*, Sept., 1902.
190. **Ruprecht, M.** External croupous otitis caused by bacillus pyocyaneus. *Monats. f. Ohrenheilk.*, 1902, No. 12.
191. **Ostino, E.** Ulcerous tuberculosis of the external auditory canal.
192. **Bogoslawski, D.** On foreign objects in the upper ear-passages and in the nose. *Wratschebnaja Gasea*, 1902, No. 42.
193. **Prota, N.** Bilateral epidemic parotitis with suppuration and perforation into the external auditory canal. Meningitis. Death. *Arch. ital. di otol.*, vol. xiv.
194. **Treitel.** Two cases of scalding of the ear. *Deutsche med. Wochenschr.*, No. 32, 1902.

185. Tumors starting from the vascular endothelium are very rare in the auricle.

A farmer, fifty-six years old, had had a small wart at the base of the right lobule since youth. The tumor had grown for two years. It is painless, though unpleasant on account of ulcerating. It is the size of a large strawberry, involves the entire lobule; the canal is free, and the function of the ear is normal. The tumor is removed: recovery. The growth shows an alveolar structure, and is composed of granular tissue with many leucocytes. The disposition of the epithelioid collection of cells, in round or oval alveoli or irregular compartments, suggests an alveolar or a plexiform sarcoma. With the high power the cells seem to be endothelial and not epithelial. The hyperplastic endothelial cells have caused a dilatation of the lymphatic spaces and capillaries, thus producing the alveolar structure of the tumor. The tumor belongs to the group of angio-sarcoma and is designated by the author as an interlymphatic endothelioma. BRANDT.

186. The patient, male, aged fifty-eight, some five years before seeing the writer, found a nodule on the auricle which subsequently broke down into an ulcer. The growth was situated in the upper part of the helix just about the region of the antihelix, and from the lower part of which extended whitish reticular tissue involving the concha, tragus, antitragus, and auditory canal. The growth was half an inch in length by three quarters of an inch in width. The case was operated upon and all suspicious tissue

carefully removed. Healing and complete cicatrization followed in about five weeks. About the end of a year there was a recurrence of the disease, which was promptly removed as before. Symptoms of erysipelas developed the following day which in no way interfered with the favorable granulating process of the wound. The case was discharged one week after the operation.

CLEMENS.

187. Examination with the continuous-tone scale gave, in the first case, complete deafness on the deformed ear. In the second case, the organ-tones from a^2 - f^5 are distinctly heard; the tones h - a^2 very indistinct; speech is heard by the right ear, after carefully closing the left (with a moistened finger), somewhat imperfectly and only with a very loud voice. In the third case, a child of three months, the hearing appears to be present.

BRÜHL.

188. The author defends the treatment of furuncles of the external auditory canal with the pressure packing which he described in *Monats. f. Ohrenheilk.*, 1899, No. 2, against the unfavorable criticism of Grosskopf in his monograph "Inflammations of the External Auditory Canal" (*Haug's klin. Vorträge*, vol. iv., No. 6).

PIFFL.

189. The best results, according to the author, are furnished by instillations of 95 per cent. alcohol with 4 per cent. boric acid and 2 per cent. cocaine in the presence of very severe pain. After the instillation the ear is occluded with cotton; the pain rapidly diminishes.

SACHER.

190. A croupous otitis. Dressing was stained light blue. Bacteriological examination: bacillus pyocyaneus was cultivated in pure culture.

BRÜHL.

191. A patient, twenty-seven years old, with hereditary tuberculosis. A polyp was removed from the outer canal and a round ulceration was found at the posterior and superior bony canal wall. It healed, and shortly after another ulcer formed in the cartilaginous canal. The pus contained tubercle bacilli.

RIMINI.

192. Of 3332 patients there were 72 cases of foreign bodies, of which 52 occurred in the ear, 11 in the nose, 6 in the mouth, 1 in the pharynx, and 2 in the larynx. A case of a fly in the vallecule and a case of complete aphonia produced by inspissated cerumen are interesting. After removing the cerumen the aphonia disappeared.

SACHER.

193. A little girl, two and a half years old, was taken ill with a double-sided epidemic parotitis, with the development of an abscess which perforated into the external canal. After an extensive incision and removal of the necrotic glandular tissue, fever and pain disappeared. Four days later temperature rose suddenly and death ensued from meningitis. According to the author, this case is remarkable, in addition to the rare termination of epidemic parotitis in the formation of an abscess, in involvement of the meninges, which must have resulted metastatically, as the middle ear and labyrinth were intact. RIMINI.

194. The author cites the cases of Bezold, Mariani, and Schäfer, and reports on two personal observations of destruction of the drum—in one case from steam, the other by fluid iron. In the latter case, the drum was not directly injured by the melted metal, as no iron was found in the canal, but through the production of steam. The characteristic condition is the unusually decided loss of hearing at the beginning. In most cases a whisper can only be heard near the ear. The simultaneous affection of the labyrinth is probably produced by hyperæmia following the great heat, and thus the permanent damage to the hearing followed hemorrhages which had taken place in the labyrinth.

NOLTENIUS.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

195. Schilling, R. On the presence of the pseudodiphtheria bacillus in acute otitis media. *Monatsbl. f. Ohrenheilk.*, 1902, No. 10.

196. Ferreri, Gherardo. On purulent otitis media in ozæna. *Archivio ital. di otol.*, vol. xiii., No. 3.

197. Schröder, W. Two cases of severe acute otitis media after taking snuff. *Münch. med. Wochenschr.*, 1902, No. 47.

198. Kühnlein, J. On the etiology of acute otitis media. *Monatsbl. f. Ohrenheilk.*, 1902, No. 11.

199. Sendziak, S. On the favorable action of erysipelas upon the course of severe, acute purulent otitis. *Monatsbl. f. Ohrenheilk.*, 1901, No. 12.

200. Halsted, T. H. The early diagnosis and treatment of acute mastoid inflammation. *Philadelphia Medical Journal*, Aug. 2, 1902.

201. Cheval, V. A case of Bezold's mastoiditis. *La presse otolaryngologique Belge*, 1902, No. 10.

202. Moure. Treatment of acute purulent otitis. *Ann. des mal. de l'or., du lar.*, etc., 1902, No. 7.

203. Mahu. Combined prolapse of the sinus and of the dura mater, making a mastoid trephining impossible. *Ann. des mal. de l'or., du lar.*, etc., 1902, 10.

195. The bacteriological examination of fibrinous membranes which were cast off and freshly formed during the acute otitis media, showed the presence of pseudodiphtheria bacillus, which can produce diphtheritic membranes as well as the true diphtheria bacillus.

BRÜHL.

196. The author attempts to show that a particular form of purulent otitis media can be produced by ozæna, characterized by an obstinate course and uncontrolled by treatment. In seven of these cases the bacillus mucosus ozænæ was found present.

RIMINI.

197. The middle-ear disease followed the taking of snuff in four and in three weeks, respectively. In the second case, both ears were diseased, though perforation took place only in one.

SCHEIBE.

198. In support of his view that bathing is of little influence in producing acute otitis, the author has examined the histories of the patients in Gerber's Dispensary, and has come to the well-known conclusion that this disease occurs most frequently in winter and in spring and most rarely in the summer.

PIFFL.

199. The author reports a case of acute otitis in a man fifty years old, with tenderness of the mastoid process, which, after existing for five weeks, healed during the course of facial erysipelas.

PIFFL.

200. HALSTED believes that in every case of suppuration of the middle ear the mastoid is involved. Thirty children, dying from various complications of measles, were autopsied with special reference to their ears, and every single case showed pus in the mastoid, while during life in the majority of the cases the ears were not thought to be involved and many were not even examined.

CLEMENS.

201. A case of this character is described, which recovered after three operations. The author is inclined to operate early, to prevent cerebral complications and to preserve a better function of the ear.

BRANDT.

202. The author agrees with Zaufal that, even in the presence of suppuration in the tympanum, a paracentesis is not absolutely indicated; the naso-pharynx should be carefully treated, carbolic-acid glycerine instilled, and revulsive measures should be adopted. If the fever and pain persist, paracentesis should be

done in the anterior and lower quadrant. After operation, irrigation with hot boric-acid solution should be repeated several times each day, and the ear should be bandaged. Ear inflation and irrigation from the tube are contra-indicated.

ZIMMERMANN.

203. In operating upon a mastoiditis after acute otitis and beginning at the typical location underneath the linea temporalis, $\frac{1}{2}$ cm behind the meatus, the sinus and dura were exposed within $\frac{1}{2}$ cm. Eighty-six temporal bones were examined and one analogous case found.

ZIMMERMANN.

b.—CHRONIC PURULENT OTITIS.

204. Geronzi. Formalin in the treatment of chronic otorrhoea. *Archivio ital. di otol.*, vol. xiv., No. 1.

205. Ehrenfried. A particular method of treating chronic otorrhoea, with a list of the medical agents employed. *Deutsche med. Wochenschr.*, No. 52, 1902.

206. Dench, E. B. Various operative procedures for the relief of chronic suppurative otitis media, and their comparative value. *American Journal of Medical Sciences*, Nov., 1902.

207. Jaumenne. The radical cure of otorrhoea in Jansen's clinic in Berlin. *La presse otolaryngologique Belge*, 1902, No. 10.

208. Frey, Hugo. The closure of the retro-auricular opening by subcutaneous injection of paraffin. *Arch. f. Ohrenheilk.*, vol. lvi., p. 289.

209. Buhe, E. The influence of the radical operation on the hearing. *Arch. f. Ohrenheilk.*, vol. lvi., p. 223.

210. Citelli, S. Stapedectomy in a patient suffering from chronic purulent otitis. *Archivio ital. di otol.*, vol. xiv., No. 1.

211. Resser, M. On cholesteatoma of the middle ear. *Medicinskoje Obosrenje*, 1902, No. 8.

212. Reinhard, P. A case of chronic otorrhoea complicated by fracture of the base of the skull. *Monatsbl. f. Ohrenheilk.*, 1901, No. 9.

204. The action of formalin in 55 cases of chronic otorrhoea is described. To relieve its irritating action, a solution in glycerine was used—2 %, 5 %, up to 10 %. In a very short time after its use the fetor disappeared, and the granulations in the middle ear seemed to be very favorably acted upon. In the author's experience a 5 % solution of formalin in glycerine, with the addition of a 5 % solution of sodium carbonate, is best borne by the patient.

RIMINI.

205. This method consists of instilling dissolving fluids in the ear and through the perforated drum into the middle ear and accessory cavities. Then, with a pipet inserted air-tight in the

canal, aspirating and pressure movements are performed to facilitate the removal of the dissolved masses of pus. The treatment is more efficacious if the pipet is connected with a small pump, or with the water pipes so that a continuous suction is obtained.

NOLTENIUS

206. This paper deals with those cases in which the suppuration is of long standing and has not yielded to the ordinary measures usually employed for its relief. DENCH believes that no matter how virulent the primary affection is, if the case is seen early in the acute stage serious intratympanic caries can be prevented; the only exception he makes to this general rule being early involvement of the mastoid cells, following acute inflammation within the ear and tubercular infection of the intratympanic structures.

The various operative methods employed for the cure of chronic suppuration are presented in detail; the writer's experience and that of others for these operations being reviewed thoroughly. A choice of any particular method must depend upon the extent to which the bony structures are involved. While in former years the writer depended upon simple operative measures, later experience has led him to believe that conservative surgery in this region is a mistake. Accepting that the simple operation of ossiculectomy is indicated in a certain proportion of cases, it will become more and more restricted as the experience of the surgeon becomes wider. In speaking of accidents during the course of a radical operation, wounding the facial nerve can always be avoided if the rule of removal of the posterior wall of the canal until the horizontal semicircular canal is seen, be uniformly followed. As to the results of the radical operation on the function of audition, Dench says: "The surgeon is not warranted in promising the patient that the hearing will be as good after the operation as it was before, unless at the time of the operation the power of audition is greatly diminished in the affected ear." However, the question is not so much the preservation or improvement of audition as the removal of a serious menace to life.

CLEMENS.

207. The indications for the radical operation, and the method of operating, as practised at Jansen's clinic, are described.

BRANDT.

208. The author recommends subcutaneous injection of paraffin to close the retro-auricular openings in those cases where the

opening is not larger than $1\frac{1}{2}$ *cm* in diameter and the margins of the opening are not formed by dense scar tissue but by movable skin. Usually two or three injections are necessary; the reaction is very slight—a slight rise of cutaneous temperature, sometimes a slight redness of the skin, a sense of swelling for two or three days, without pain. Seven cases are reported with fourteen illustrations. In one case the edges, which had become approximated by the injection, were freshened, and union occurred without suture.

HAENEL.

209. The subject of these investigations was 112 cases which had been operated on in the ear clinic at Halle since April, 1894. Only those cases were taken where, at the time of examination of hearing, the healing was complete and remained so. The examination consisted of the use of the whisper, with *c*¹ and *F* sharp ⁴ tuning-forks. Thirty-four per cent. were improved, 36 % stationary, and in 30 % there was a deterioration of hearing. In comparison with other statistics, those of Trautmann furnish about the same result, while all the others are more favorable. The following conclusions are obtained:

The hearing results after operation, which have been published, are unreliable and cannot be compared, because up to the present time there is no uniform method of examination in practice. The general opinion on the influence of the radical operation on the hearing is much too favorable a one, and does not seem to be correct.

1. An improvement of hearing, or stationary hearing, follows radical operation generally in the cases in which the labyrinth or labyrinthal walls are intact and the hearing for whisper is under 1 metre.

2. An improvement always takes place when obstruction of the canal is present before the operation.

3. An improvement in hearing, or stationary hearing, is to be expected if the labyrinth and labyrinthal walls are diseased, or if only a very slight remnant of hearing is present before the operation.

4. Diminished hearing occurs in almost all patients who hear in one metre or more, before the operation, even if the labyrinth is healthy and remains so.

5. Deterioration of hearing occurs when the labyrinth and labyrinthal walls are diseased and the hearing power for whisper is between .25 *m* and below 1 *m*.

HAENEL.

210. A patient, twenty years of age, suffering from bilateral chronic purulent otitis where the drum was totally absent, and the stapes in the right ear, situated upon the promontory. It was removed with a small pair of forceps; five hours later, H. was marvellously improved. The whisper was increased by more than 1 m, and the perception of the lower tones was almost normal. After three months, the old condition of the hearing returned, together with subjective noises, presumably due to the contraction of the scar in the oval window. It is interesting to know that in the absence of the stapes, with intact oval window, the perception of the lower tones is good. RIMINI.

211. The author describes two cases which are treated operatively: One in a farmer, seventeen years old, was a true cholesteatoma, which began, presumably, in earliest childhood; in its growth it had destroyed the tympanic cavity completely. There was no history of long-continued suppuration. In the second case, cholesteatoma occurred after middle-ear suppuration.

SACHER.

212. A child with chronic otorrhœa suffered from fracture of the skull with cerebral concussion; there were well-marked cerebral symptoms, high fever, and a swelling over the mastoid process. At operation extensive caries and a multiple fracture of the temporal bone were found. The operation had to be interrupted on account of collapse of the patient. It was completed after nine weeks, terminating in recovery. PIFFL.

C.—CEREBRAL COMPLICATIONS.

213. **Schmiegelow, C.** Contributions from the Otolaryngologic Department of St. Joseph's Hospital for the year 1901. *Ungeschrift for Laeger*, Nos. 33 and 34, 1902.

214. **Panse, Rudolf.** Clinical and pathological communications. *A. f. O.*, vol. lvi., p. 275.

215. **Delsaux, V.** Contribution to the study of the intracranial otitic complications. *La presse otolaryngologique Belge*, 1902, No. 7.

216. **Gillot, V.** Otitic cerebellar abscess. *La presse otolaryngologique, Belge*, 1902, No. 9.

217. **Laurens.** Cranial resection for osteomyelitis of the squamous portion of the temporal bone of otitic origin. *Ann. des mal. de l'or., du lar., etc.*, 1902, No. 7.

218. **Jurgens, E.** Two cases of rupture of the internal carotid artery in disease of the middle ear. *M. f. O.*, 1902, No. 1.

219. **Capart, A.** Bezold's mastoiditis; operation; purulent meningitis; autopsy. *La presse otolaryngologique*, 1902, No. 7.

220. **Grivot.** Chronic otitis and cholesteatoma, facial paralysis, Bezold's mastoiditis, abscess of the neck and occipital osteitis; death from meningitis. *Ann. des mal. de l'or., du lar., etc.*, 1902, No. 7.
221. **Schmiegelow, E.** Otitic pyæmia. *Nordiskt medicinskt Arkiv.*, vol. i., Nos. 2 and 3, 1902.
222. **Koch.** A case of sinus thrombosis with otitic pyæmia healed by operation. *Ungeskrift for Læger*, No. 49, p. 1153, and No. 50, p. 1197, 1902.
223. **Lannois.** Thrombophlebitis of the lateral sinus. Société médicale des hôpitaux de Lyon. Seance du 3 Oct., 1902. *Lyon médical*, 1902, No. 41.
224. **Lederman, M. D.** Thrombosis of the lateral sinus and internal jugular vein, with re-infection of the sinus after ligation of the vein. *Laryngoscope*, Nov., 1902.
225. **Hennicke.** A case of otitis media, sinus thrombosis, and double cerebellar abscess. *M. f. O.*, 1902, No. 9.
226. **Streit, Hermann.** Additional cases of endocranial complications of acute and chronic middle-ear disease. *A. f. O.*, vol. lvi., p. 178.
227. **Fedortschenko, M.** Two cases of otitic pyæmia. *Wojenno medicinski Shurnal*, 1902, Nov.
228. **Leutert, E.** Reply to Körner's critical remarks on my paper on otitic pyæmia. *A. f. O.*, vol. lvi., p. 215.

213. The author reports on six cases of middle-ear suppuration with fatal termination. In all cases, operation was performed. The mastoid process was usually opened and the radical operation performed. The first two cases were acute suppurations with mastoiditis, in diabetic patients. In one case, death resulted from acute purulent meningitis, which probably resulted by direct extension through a necrosing osteitis. In the other case, on the third day after operation, diabetic coma set in with fatal termination after two days. The two following cases were chronic suppuration with extensive caries. After operation, the patients died from meningitis. In both, the sinus and the superficial area of the temporal bone were healthy. In one, a labyrinthal suppuration existed, and the pus reached the meninges along the eighth nerve. In five cases, cerebral symptoms were absent at the time of operation and the patient died a few hours later. Autopsy showed a tubercular meningitis and caries of the temporal bone, with perforation through the tympanum. The sixth case was very instructive: a chronic suppuration was present, with vertigo and vomiting. The radical operation was performed; the dura was exposed and found healthy. After a few days, pain, rise of temperature, slight rigidity of neck, and drowsiness set in; the sigmoid sinus was exposed; the brain was punctured in various directions, with negative result; the condition was somewhat variable, with a

jumping temperature; rather rapid emaciation. After five weeks, an abscess developed in the left palatal arch; the cerebellum was exposed and punctured, but nothing found. The patient died after a few days. In the dura, at the internal porus acusticus, the perforation was found, and an abscess as large as a walnut in the adjoining part of the cerebellum. MOLLER.

214. The author reports on the microscopic examination of the temporal bone, gained from five cases of fatal labyrinthal suppuration. The report of the brain autopsy, and the case history of two patients who were observed clinically, are added; there are fourteen illustrations.

(1) Influenzal suppuration; perforation through both windows into the labyrinth; transmission along the water channels and the auditory nerve to the interior of the skull; destruction of all the nerve terminals in the labyrinth (corresponding to the hearing tests) and diffuse meningitis.

(2) Perforation of the pus through the oval window; purulent disintegration of the entire labyrinth, with the aqueducts; purulent inflammation in the internal auditory canal. Notwithstanding the threatening infection of the meninges, death resulted from a cerebellar abscess consequent to antral disease.

(3) Perforation through both windows into the labyrinth; extension by both aqueducts and the acoustic nerve to the meninges.

(4) Entrance of pus through the oval window; extension along the aqueducts and auditory nerve to the meninges, from here to the auditory-nerve of the opposite side and to the cochlea of the other ear.

(5) Entrance of suppuration through the oval window, destroying the membranous structures in the labyrinth; the cavities filled with newly formed connective tissue. Notwithstanding this tendency to heal, infection of the meninges. HAENEL.

215. A patient with left-sided otorrhœa complained of severe pain in the forehead and temporal region of the right side. On account of high fever, left facial paralysis, sagging of the membranous wall, and fetid suppuration. The roof of the left middle ear, of the aditus, and of the antrum were removed and a brain abscess was evacuated. After five days, fresh fever, with rigidity of neck. Collapse. The author explored the left cerebellar fossa, without finding the anticipated second abscess. Death. The case is unusual on account of pain being localized in the opposite side. The high sounds were normal, notwithstanding the

symptoms of increased intracranial pressure. The pus extended to the cranial cavity, without involving the antrum. Autopsy showed a very extensive amount of disease before death ensued.

BRANDT.

216. A patient, twenty-three years old, had been ill for several days and had never complained of his ears. There was no otorrhœa, and the mastoid process was not tender. On account of these symptoms, a tumor of syphilitic nature was suspected. Death ensued after fourteen days' treatment. An abscess as large as a nut was found in the right half of the cerebellum, with a smaller adjacent one. In the right temporal bone there was a small, carious focus, together with mastoiditis.

BRANDT.

217. In the case of a small girl, the entire mastoid process was found disintegrated and filled with fetid pus. There was an extradural abscess over the tegmen, and the squama was removed externally in the neighborhood of the parietal suture. It was then found that the diploë was infiltrated with pus. Two weeks after, on account of profuse suppuration, the entire necrosed squama was removed; the suppuration ceased and ossification soon set in from the periosteum throughout the entire defect.

ZIMMERMANN.

218. The author reports on two similar cases of carotid hemorrhage in recruits, occurring during an acute exacerbation of a chronic purulent otitis. Hemorrhage occurred after cauterization of the ear; it was arrested by packing, but always started up again. Death occurred in both cases from meningitis and sepsis. Autopsy revealed extensive destruction of the arterial walls. The author is in favor, in these cases, of packing after radical operation. In his opinion, ligation of the carotids is without avail.

PIFFL.

219. The patient suffered from right-sided otorrhœa, with mastoiditis, after gripe. At operation fistulous tracts were exposed, leading down and back to the occiput. The carious bone was removed. At the second operation, the presupposed brain abscess was not found either in the temporal lobe or in the cerebellum. Death. The meninges were infiltrated with pus, especially over the frontal lobes. The left half of the base of the cerebellum was likewise affected, while the right half was normal. There was no brain abscess. The case is supposed to be an example of crossed brain lesion; inflammation of the meninges of the left side of the cerebellum in disease of the right mastoid process.

BRANDT.

220. The case is described in the title, though it is reported with all detail.

ZIMMERMANN.

221. A report of five cases of otitic pyæmia, which were cured by the radical operation. In the first four cases, no evidence of disease of the sigmoid sinus was present, while in the fifth a sinus thrombosis existed. In the first two, there were no metastases and only general septic symptoms. In the three, there was a superficial infarction and a septic empyema. At operation a large cavity was found filled with cholesteatoma, which had perforated into the middle cranial fossa. In four cases, a sub-periosteal abscess was present which had partly perforated towards the meatus and was also in connection with the fistula, with the posterior cerebellar fossa; not, however, with the bone abscess in the mastoid process. A large epidural abscess was found in the posterior cranial fossa, which communicated by a defect in the dura with the cerebellar abscess. Later, a retropharyngeal abscess developed by gravitation. The pus was liberated by an incision in the pharynx and by perforating into the auditory canal. A pulmonary abscess set in later. In the fifth case, at operation, a purulent, disintegrated sinus thrombosis was present. The sinus was opened, cleansed, and the jugular vein ligated. Notwithstanding, an abscess occurred in the left elbow and in the lungs, though the infection in the elbow was present before operation. The pathogenesis and symptoms of otitic pyæmia are thoroughly discussed. The author is of the opinion that an otitic pyæmia exists without sinus thrombosis, but that the osteophlebitis theory of Körner has not been proved; he thinks that pyæmia, where no sinus disease is present, is caused by direct absorption of septic products from the middle-ear cavities. As to the treatment: in acute cases, a simple mastoid operation, with incision of the drum, is sufficient, while in the chronic suppurations the radical operation is indicated. It is always of great importance to determine the condition of the sinus. Inspection and palpation are sufficient, as an obturating thrombosis is easily recognized, and a parietal thrombosis cannot be diagnosticated, even on opening the sinus, on account of hemorrhage. If septic thrombosis is present, the sinus must be broadly opened and evacuated, and then the jugular vein must be ligated.

A double ligature should be applied, and the vein divided between the two. The paper concludes with a report of all the operative cases of otitic pyæmia occurring in Scandinavian literature.

MOLLER.

222. The patient was a girl of twelve, who had suffered from double-sided purulent otitis after scarlet-fever in early childhood. During the past three weeks she had suffered from intermittent fever, rigors, vertigo, and vomiting. The right ear discharged freely and the tip of the mastoid process was swollen and tender. The tenderness extended on the sterno-mastoid muscle, without distinct infiltration. On the day following admission, a copious hemorrhage occurred from the right ear. The radical operation was performed and a perisinuous abscess evacuated. The wall of the sigmoid sinus was perforated and the sinus filled with a disintegrated, purulent thrombus. Five days later, a gravitation abscess under the upper half of the sterno-mastoid muscle was incised. The symptoms of pulmonary abscess and septic empyema led to a resection of the ribs. The patient recovered after three and a half months. A few remarks are added on the origin of sinus thrombosis and of otitic pyæmia, as well as on symptoms and treatment of this disease.

MOLLER.

223. Otorrhœa in a child, with symptoms of mastoiditis. At the first operation a healthy mastoid process was encountered; after a few days, symptoms of phlebitis of the internal jugular vein set in. The thrombosed section of this vein was extirpated. Death. At autopsy, numerous small abscesses were found in the lung, and thrombosis of the transverse sinus. A manifest communication between the sinus and antrum or tympanum did not exist; a change in the bone in this neighborhood was also absent. According to the author, infection occurred along the small diploic veins. We cannot understand why the transverse sinus was not exposed and cleansed when the jugular vein was resected. RAU.

224. Patient, aged seventeen, had suppuration in the right ear off and on for ten years. It was quiescent until one week before having been seen by the writer, at which time he received a severe blow over the ear, causing a bloody discharge with severe pain for two days. There was slight tenderness over the mastoid antrum; a temperature of 100° F. The usual local treatment failed to make any favorable impression; the familiar symptoms of septic infection soon developed. At the primary operation much carious bone and a large septic thrombus filling the lumen of the sigmoid sinus was removed. Free bleeding followed from the upper portion, but no return flow occurred from the inferior portion. The jugular was thereupon exposed, ligated, and, as no macroscopic evidence of disease was observed, it was not

resected. Two weeks later pus was observed coming from the upper opening of the sinus, which was again opened as far back as the torcular, and an infected thrombus removed therefrom. The subjective symptoms gradually disappeared after this. Although the openings in the antrum and sinus were treated separately, the secondary infection appears to have come from the soiled antrum dressings.

CLEMENS.

225. A boy, eight years of age, suffered from otorrhœa for one and a half years. He was taken ill with fever, headache, and somnolence; polypi in both ears, both mastoid processes swollen. Left ear was operated on. The antral walls were found carious. Intermittent fever, rigors, led to operation on the right side eight days later. As no explanation for the severe condition of the patient could be found on this side, the sinus on the left was exposed. Two thrombi were removed. The temperature dropped. Rigidity of neck, retracted abdomen, facial paralysis, and delirium. Notwithstanding infection of the brain abscess, death took place during convulsions. At autopsy, two cerebral abscesses were found on the right side, one of which communicated with the operative wound.

BRÜHL.

226. This is a continuation of the previous paper on this subject by Schencke and the author. The five additional cases of sinus thrombosis from Leutert's practice are reported; also a case of obliteration of the sinus and one of otitic meningitis without sinus thrombosis.

HAENEL.

227. The patients in both cases suffered from acute otitis. In the first case, the infection at autopsy was found to have extended by way of the transverse sinus, which contained a broken-down clot. The second patient recovered; infection probably occurred through the agency of small blood- and lymph-vessels.

SACHER.

228. LEUTERT replies to the criticism which Körner, in the last edition of his book, makes on his paper on pyæmia. The author does not doubt that the small veins of the mastoid process can be thrombosed, but he does not think that it has been proven that the thrombosis of the osseous veins can of itself produce pyæmia, as an examination of the thrombosed veins of the mastoid process in pyæmia, especially in pyæmia without sinus thrombosis, has not been made. A parietal thrombosis does not produce the same clinical picture as the one described by Körner as following osteophlebitis pyæmia. He thinks that both varieties

of thrombi, parietal and obturating, can produce both forms of general intoxication (two forms of metastases), according to their composition and the stage of their disintegration. As Körner has acknowledged the possibility that his infection may be present in the sinus thrombosis, this disease picture has lost its justification as depending upon a particular anatomical foundation. In conclusion, Leutert states that von Bergmann had recommended, one year before him, the ligation of the jugular vein above the entrance of the facial vein, although he had been the first to insist upon it.

HAENEL.

d.—OTHER MIDDLE-EAR AFFECTIONS.

229. Haskin, W. H. Epithelioma of the middle ear. *Annals of Otology, Rhinology, and Laryngology*, Aug., 1902.

230. Jurgens, E. A case of hemorrhage from the middle ear, from the jugular bulb, after cauterization. *M. f. O.*, 1902, No. 4.

229. Patient, female, aged forty-two, with negative family history, has had otorrhœa at intervals for the past thirty years; never received any treatment and rarely had any pain. At the time of examination she complained of intense pain in the left ear, which radiated over the corresponding side of the head, down in the neck, and of something protruding from the ear. The auditory canal was completely filled with a large mucous polyp, which was removed under nitrous oxide, followed by profuse bleeding. The pain was not relieved by the operation, and the growth in a very few days had again developed. Microscopic examination of the polyp revealed simple myxoma with cystic degeneration. As the pain continued in severity a radical operation was made. A large vascular mass was found occupying the antrum, attic, and tympanum, the surrounding osseous tissue being nearly all destroyed. The tumor removed at this operation was pronounced to be "epithelial," but not an epithelioma. The progress of this case was unfavorable; the wound filling with unhealthy granulations from time to time, which, upon being examined four months after the initial operation, was pronounced to be epithelioma without doubt.

CLEMENS.

230. In a soldier twenty-one years of age, after cauterizing the right tympanic cavity with an acid, a hemorrhage took place from the jugular bulb. It was arrested on packing, but recurred twice on changing the dressings within the following eight days. The labyrinthal wall was necrotic and there was profuse purulent

secretion. There was complete deafness in the right ear; the hearing of the left was very much reduced. PIFFL.

NERVOUS APPARATUS.

231. **Gronlund, M.** A case of labyrinthine deafness of acute onset. *Hospitaltidende*, No. 41, 1902.

232. **Chavanne.** Unilateral hysterical deafness of five years' duration in a patient suffering from Jacksonian epilepsy. *Ann. des mal. de l'or., du lar.* etc., 1902, No. 7.

233. **Bogdanow, Beresowsky, M.** On the pathology and treatment of progressive deafness. *Russki Wratsch*, 1902, Nos. 30, 31, and 32.

234. **Hartmann, F.** On the so-called tumors of the auditory nerve. *Zeitschr. f. Heilk.*, vol. xxiii., No. 11.

231. The patient was a boy fifteen years of age, whose health had always been good. During a voyage he gradually lost hearing for speech. He would perceive that something was said, but did not understand it. Other signs he recognized fairly well. Gait is uncertain and staggering, and if he stands with closed eyes he wavers considerably. Patellar reflex is present; otherwise, physical examination revealed nothing abnormal. Examination with Bezold's continuous-tone series showed tone defects between F and h², sometimes sharply defined and other times varying in extent and position. At the beginning, the deep tones were missing, while hearing for the high tones was good. Examination with speech showed that certain vowels, consonants, and syllables were correctly perceived, while others were not. As to etiology, it was said that he smoked a great deal, drank considerably, but did not remember any injury; he denied syphilis. There is no history of any infectious disease, though before the onset of the deafness he remembered having been kept in bed by severe headache and pain in the stomach. Iodide of potash was given. He was treated with faradisation and warm baths without any effect. After one and a quarter years he returned for treatment and condition was much improved. The author believes that this is a case of sound deafness of labyrinthine origin—perhaps in connection with a very mild cerebro-spinal meningitis. At first the case seemed to be the usual cerebral word-deafness; but the functional examination and the vertigo spoke for labyrinthine trouble. MOLLER.

232. The patient, twenty-two years of age, became deaf five years ago after an epileptic attack, and has remained so. The functional examination revealed positive Gellé and the presence

of reaction in bone-conduction from this and other hysterical symptoms. The diagnosis of hysterical deafness was made; the hearing was very much improved after treatment with the galvanic current and suggestion.

ZIMMERMANN.

233. Two cases of progressive deafness where the examination with the Bezold's continuous-tone series suggested a very probable affection of the auditory-nerve trunk. Subcutaneous injections of strychnine in the neighborhood of the mastoid process were given, and a distinct improvement in hearing, with a diminution of the tinnitus resulted. The strychnine injections were given in 22 cases of tinnitus; in 17 cases a distinct diminution resulted.

SACHER.

234. This monograph thoroughly reviews all that is known on this subject and endeavors to give a complete clinical picture of the tumors of the auditory nerve. Three personally examined cases are added to the twenty-three found in literature. After a detailed description of each case, the results collected are as follows: Age of the patients varied between thirty and fifty-five years; two-thirds of the cases were male and one-third female. The etiology of the tumors was unknown. Severe traumatism was given as the cause in three cases, and the author is inclined to regard congenitally dispersed germ cells incited to pathological growth through traumatism as the reason for the growth of these tumors. The symptoms are described, with the growth of the tumor in the typical position in the recessus acustico-cerebellaris. General symptoms occur late in the disease and consist in vomiting and headache. Of the focal symptoms, in addition to the vertigo, the early appearing and generally the only symptom is the disturbance of hearing, which leads to complete deafness. The other symptoms consist of cerebellar ataxia, paresis of various ocular muscles, frequently the disturbance of the trochlearis and the disturbance of the fifth nerve with facial paralysis, and in the minor stages, disturbance in the region of the ninth to twelfth nerves. The characteristic picture of this disease is furnished by those cases in which complete nervous deafness is associated with various functional disturbances of a mild grade on the part of the organs in the posterior cerebellar fossa. In regard to treatment, the author believes that operative intervention is decidedly indicated on account of the nature of the disease, the typical localization, and the characteristic easy enucleation of the tumor mass.

PIFFL.

BOOK NOTICES.

V.—**Précis de Chirurgie cérébrale.** Par A. BROCA, Chirurgien de l'hôpital Tenon; Professor agrégé à la Faculté de médecine de Paris; Membre de la Société de chirurgie. Paris: Masson & Comp., 120, Boul. St. Germain, 1903. Small 8vo of 488 pages, with 58 figures. Cloth binding, fr. 6.

This is an excellent treatise, both theoretical and practical. It is divided into two parts. The first contains general knowledge: the anatomy of the lobes, fissures, and convolutions of the brain, descriptive and topographical; the cranio-cerebral topography, the determining points and lines on the outside of the head with regard to the position of the parts in the head.

Then follows a chapter (III.) on cerebral localization, motor, sensitive, and sensory, and the centres of language.

Chapters IV., V., and VI. treat of the clinical indications and the operative management of brain surgery, and of the dangers of the intervention.

The special part begins with the traumatic lesions, to which are devoted ninety-eight pages. Then follow the intracranial complications of purulent middle-ear inflammation (162 pages), meningitis, sinus phlebitis, and abscess (epidural, cerebral, and cerebellar). These extensions of the purulent process of the tympanum and mastoid apophysis are described with great detail, supported by numerous operative and post-mortem verifications or corrections of the diagnosis; for instance, the apparent presence of meningitis, which was cured by extensive operations where neither abscess nor meningitis was found, which is explained by the œdema surrounding more or less extensively the purulent foci in the middle ear and mastoid, cases of which have been noted by every aurist of sufficient practice.

Sinus phlebitis and abscess are described exhaustively in their pathology, symptoms, and surgical interventions. The exposi-

tions are so clear, so well digested, and going over so much ground that the reader is fascinated by the variety and usefulness of the subjects.

The remainder of the *Précis* is devoted to intracranial tumors (very good statistics, symptomatology, and localization) and diverse brain lesions—hemorrhage and softening, meningitis and abscess from different causes, metastatic, etc., general paralysis, hydrocephalus, microcephalus, and various functional troubles—epilepsy, psychoses, cephalalgia, and encephalocele. All these affections are carefully described. The author dwells on the differential diagnosis and the surgical and palliative treatment of these frequent and often occult diseases, pointing out which of them and in what way they are amenable to treatment.

The neat, interesting, and instructive book should, and surely will, be read extensively.

H. KNAPP.

VI. — A Text-Book on the Diseases of the Ear. By Prof. ADAM POLITZER, M.D. Fourth edition, revised and enlarged, with 346 illustrations. Translated by MILTON J. BALLIN, Ph.B., M.D., and CLARENCE L. HELLER, M.D. Lea Bros. & Co., Philadelphia and New York, 1903.

This is the translation of the fourth edition of the classical text-book of otology by the famous professor of the Vienna University, which, by general consent, is considered as the standard treatise on the science and practice of aural surgery, a rank which it has maintained for so many years. The translation is by two young and talented aurists, one of New York, both Americans, who, as Politzer's assistants, made the translation in Vienna under the supervision of the author, while the German edition went through the press. The translation is well done, and the typography does credit to the well-known American publishers. We reviewed the appearance of the fourth German edition several months ago, and can only add that we are assured that the English rendition will meet with the favor which it has enjoyed before, and so fully deserves.

H. KNAPP.

EDITORIAL NOTICE.

The **Archives of Otolaryngology** is a bi-monthly journal, published in annual volumes of about five hundred pages each, extensively illustrated with cuts in the text, half-tone text plates, and lithographic plates, many in colors. About three-quarters of the space is devoted to original papers, and the remaining quarter to a systematic report on the progress of otology, and to reports of societies, book reviews, and miscellaneous notes. The papers and reports are original, and only accepted with the understanding that they are to be published in this journal exclusively. The original papers in the English edition appear in the German (*Zeitschrift für Ohrenheilkunde*) either in full or in more or less abridged translations, and *vice versa*. Any subscriber who wishes to refer to the original text of a translated or abridged paper may, by applying to the editor, obtain a reprint which he is expected to return after perusal.

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ARCHIVES OF OTOLOGY.

SHOULD THE DEAF BE DEBARRED FROM ACCIDENT INSURANCE?¹

By DR. JAMES A. SPALDING, PORTLAND, ME.

IF you were asked this question, you would probably reply that you did not know that they were; or you might say that they ought to be, because, as they do not hear, they are more exposed to accidents than those with good hearing, and who being so provided can escape with greater certainty from any impending accident. I am willing also to confess that I should have thought so myself, if I had enjoyed good hearing all my life. Having, however, been deaf to a considerable degree for more than thirty years (yet without any accident due to this defect), I had never considered myself a greater risk to any insurance company than people who hear. In February last, however, when offering my yearly premium to a New York Company to which I had paid a good deal of money without any indemnity, I was surprised to have it returned. To my inquiries they replied that they did not consider me a good risk, owing to deafness, although they had always known of this condition, as it was so stated in the original application.

When one has been long protected against accidents by insurance, and when his mind has been free from anxiety because he never has met with an accident from defective hearing, he feels alarmed to find his protection removed, and, as he believes, unjustly and unscientifically. In this state of alarm, I felt that I could do no greater service to a defective class of our population (asserted by some to

¹ Read before the Otological Section of the New York Academy of Medicine, May 14, 1903.

rather nearly a million, than to look more carefully than seems to have been done as yet by any of our noted otologists into a question of public importance.

For if insurance against accident is to be denied to all the deaf as it has been denied to one later on insurance for life may similarly be denied us, on the ground that, owing to our defect, our lives, although good from a physical examination and family history, may be abbreviated by accidents due to deafness, so that insurance for life should be denied us entirely, or smaller policies should alone be written, or higher premiums demanded. In other words, if exclusion of the deaf is adopted by other companies, this defective class may be forced to abandon insurance or only be enrolled in the dangerous class.

If insurance is a benefit, and I am of those who believe in it as protection for one's family and one's self, the deaf should have their rights defined. I intend therefore to try to show to you that, from my experience and investigations, they are as safe to insure as those who can hear.

If, furthermore, we recall a resolution offered, if not actually passed, at a recent meeting of otologists, for the prevention of noise by compulsory use of rubber tires on all vehicles, we shall note that our confrères are doing all that they can do to bring about increased risk of limb and life to all, to say nothing of equalizing insurance for those who are deaf and those who can hear. From my point of view they are trying to put us all on the same level so far as hearing anything on the streets is concerned.

From the meanest scientific aspect, if denied equal risks with those who hear, I shall claim that accident insurance should be given to the deaf for every other possible accidents than those likely to affect pedestrians.

Let me recall a curious incident, showing how the deaf may be better risks than those who can hear.

Some years ago as I was walking rapidly along the streets, for I never owned a horse or used one except upon compulsion in my life, I felt by vibrations communicated through my feet a noise that I could not understand. Looking around I saw dashing toward me, on the same pavement on

which I was walking, a runaway horse, dragging and slatting about at his heels the remains of a carriage. It was the action of a second to step aside and let him pass. Continuing down the street he injured two people who, as I afterward discovered, had the best of hearing. My better hearing in a noisy street, together with my good bone-conduction, saved me; the good hearing of those people, diminished by the noises of the streets and their total absence of bone-conduction, failed to save them from injury.

Now, barring those obstinate, foolish old men who walk on railroad tracks contrary to all laws of common sense, and who as a consequence of their folly are injured or killed, careful investigation of street accidents will show about the same percentage of injury amongst the deaf as amongst those who can hear (I leave aside accidents not connected with hearing), and I base my assertion on reasons of great weight to otologists who have studied aërial and bone-conduction.

My first point is that the deaf hear better in the noise of the streets than those with good hearing. When a deaf man walks about with his friends in the streets, he is obliged to shout to make them hear. They can make themselves audible to him with an ordinary voice. The louder the noise, the better most deaf persons hear. Noise abolishes their tinnitus and in some way improves their hearing, probably by producing increased tension of the drumhead.

In Pullman cars, where the noise is muffled by easy-running axles, the deaf do not hear well. But in ordinary cars they hear well so long as the car is moving rapidly. When it stops, they are obliged to ask their friends to speak louder. I know a man with one ear good, the other deaf. When the car is not moving, he hears perfectly with his good ear. When it is moving and there is much noise, he, unconsciously, turns around his deaf ear with which to carry on conversation.

Hearing better in a noise has been denied, and the fallacy, as it is called, exposed by saying that if the deaf hear better in a noise it is only because their friends unconsciously raise their voices as the noise increases. This may be so, or it may not be so, as a mere matter of opinion. I ask you,

however, to explain to me the fact, that many deaf people can hear in a noise a Galton whistle or a tuning-fork which those with good hearing cannot hear. Yet neither the whistle nor the fork is sounded louder in the test for the deaf than in that for those who hear. To my ears and to my mind this is a crucial test and worth more than mere opinions.

Next, you are all familiar with bone-conduction. Yet how often its true significance is lost,—how often we hear it given as a sound medical opinion that so and so cannot be deaf because on dropping on the floor a coin or a key so that he could not see the action, he, nevertheless, turned around to investigate the noise, something that he would not have done had he been deaf. This, however, as we know, is just what he should do, being deaf, and is proof positive of his loss of aerial conduction, and of the preservation of his bone-conduction.

It is now this bone-conduction, this susceptibility of the deaf person to noises transmitted through his feet, which renders him unusually free from accidents, to say little of the undeniable fact that all defectives are more watchful of their surroundings than those who rely too absolutely upon their perfect faculties.

Recall, again, my curious escape from a runaway horse, whilst those with good hearing, in quiet but not in noisy streets, without bone-conduction, and not watchful, fell victims. I find, however, that since wearing rubber heels my bone-conduction is not so good as it used to be with leather heels.

Furthermore, by bone-conduction the rumbling of heavy vehicles is felt by the deaf *sooner* than the sound made by whistles or bells or cries of warning can reach those that hear.

The watchfulness of the deaf, and of defectives generally, is analogous to that same trait in invalids, who take great care of themselves, who expose themselves but little, and who by so doing long outlive those with enormous strength and overflowing vitality carelessly exposed. Think here too of the blind, how fearlessly they go about, yet how rarely they are injured, owing to their carefulness.

From a third point of view, those who deny insurance to the deaf should make careful investigations amongst deaf-mutes. Here is a virgin soil so far as I can see. My investigations show an almost absolute immunity of these defectives from accidents that might be due to deafness. A teacher in a school, through which passed in her ten years of service more than five hundred of this class of people from six to twenty-one years of age, never knew one of them to meet with injury in the streets. Nevertheless they hear nothing, and most of them have no bone-conduction.

More accidents are due to lack of presence of mind than to loss of hearing. How often we read of some person deciding to go ahead of a vehicle, then deciding to pass behind, only to meet the heavy vehicle hopelessly under way and to suffer injury or death. Absence of mind plays a great rôle in accidents, neither the sight nor the hearing being utilized as they ought for self-preservation. People so afflicted should be enrolled amongst the defectives and the bad risks.

As an instance: three men are working in an elevator shaft, the floor-to-floor doors rising and falling automatically with the movements of the car. The elevator car rises, the two men with good hearing hear it coming, hear the warning whistle, but hesitating a second they jump the wrong way and are injured. The third man, nearly totally deaf, hears nothing, yet by presence of mind escapes without a scratch.

From another point of view, accidents depend more upon the rapidity with which they occur than upon our ability to escape even with perfect hearing. Here we need neither hearing nor sight. Our escape depends on our agility.

Furthermore, it is a fact that people with loss of sight of one eye, or with high degree of myopia, or with loss of their visual fields, are very hazardous risks. When exact justice is done to all applicants for insurance, all defectives should be classified side by side with the deaf, under a free and scientific interpretation of defects of the body.

Statistical examination of thirteen thousand indemnified accidents showed me nearly thirteen hundred occurring to

pedestrians. Out of these, about seventy were likely to happen to both those who hear and those who are deaf. Excluding those in which the good hearing had probably been diminished by the noises of the street, I failed to find more than seventeen that could positively be ascribed to deafness and to no other cause. It is therefore plain that seventeen deaf claims out of thirteen thousand is an infinitesimal percentage, and one that no company should be permitted to refuse.

This paper is to call your attention as aurists to the investigation of such accidents as you may know of from your patients, medical friends, medical examiners, railroad surgeons, etc., so that by statistical papers we may establish a scientific basis of the probabilities for and against insurance of the deaf. In this way only can we ultimately obtain a fair insurance-valuation for accidents due to deafness alone.

In a word, I would like to awaken some interest in a topic important to a large class of defectives. If the deaf are a greater risk, let them pay more. If not, let them have equal chances with those who hear well. The lessons that I would have you teach to all with whom you come in contact are: that it is an exaggeration to claim that the deaf are more liable to accidents than those that hear; that their lives are as safe a risk as those of the average insurable person; and that although your attention has not often been called to this subject, yet what you once heard here, at a meeting of your Society, left no reasonable doubt in your mind that the chances of the deaf on the streets are fully equal to those whose hearing is good.

At all events, my conclusions, based on personal experience and considerable thought and study, are that—

Owing to the greater care which the deaf person takes of himself, because of his very defect;

Owing to his better perception of sounds in the noise of the streets than in the case of those who can hear;

And owing to his bone-conduction, whereby he early becomes aware of approaching danger,—he is as good a risk against pedestrian accidents as are those who can hear well.

TINNITUS, WITH A PLEA FOR ITS MORE ACCURATE MUSICAL NOTATION.

BY DR. JAMES A. SPALDING, PORTLAND, ME.

(*With eight text-cuts.*)

Read before the Otological Section of the New York Academy of Medicine,
May 14, 1903.

NOTHING especially new regarding the pathology of tinnitus has appeared since the publication of recent articles by Panse (ARCHIVES OF OTOLOGY, vol. xxviii., p. 353) and Phillips (*The Laryngoscope*, March, 1902). Therefore there is no need for me to go over the same ground with these or other writers, whilst you are all familiar with the views expressed in modern text-books. My purpose in coming so far from home is to call your attention to a proposal for a more accurate investigation of the position of tinnitus in the musical scale, to see if a more graphic notation cannot be recognized, and to say something about the methods of treatment which have seemed useful in my practice. My idea is that in the treatment of chronic dry catarrh of the middle ear and its forerunner or sequence, tinnitus, we follow altogether too rigidly the well-beaten paths, and fail to make new openings for ourselves. I ask you if it would not be a great deal more accurate and scientific, instead of talking, for instance, of tinnitus as buzzing, roaring, rustling, singing, blowing, humming, puffing, thumping, beating, crackling, whistling, hammering, raining, booming, thundering, chirping, tinkling, steaming, etc., to analyze each case more accurately, to test each patient along the keyboard of the piano with the purpose of discovering, if possible, a more accurate location of the

given sound in the labyrinth, and later on of establishing a more rational basis for treatment than that which we now possess.

It is easy to say that very few people have any idea of musical pitch, but a little research will show you that many people can "place" their tinnitus with considerable exactitude. Even if but few can do this, amongst the hosts of aural patients, we may at least make a beginning, and if we meet with encouraging results go farther on.

Panse and others have tested their many patients with tuning-forks, but it must be confessed that all such tests are insufficient and unscientific in comparison with the more careful testing, semitone by semitone, along the whole extent of the piano keyboard.

For many years I have had care of the ears and hearing of a man who has made the profession of music his life-work, and who, of course, has musical notation at his fingers' ends. During this time he has consulted me for several losses of hearing from impacted cerumen, but after its removal by the syringe his hearing, as tested by forks and the entire range of a large organ and a grand piano, has been found perfect. At his last but one attack of deafness, there was, instead of cerumen, a slight tubo-tympanic catarrh which soon yielded to the catheter and inflation. At his very last attack, recovery was slow, and he complained for the first time in his life of tinnitus, which he wrote out thus:



beginning, as you see, on *c* and gradually sweeping up through *g*, *d'*, *e'*, *f* sharp, to *g'*, where it remained constant about a minute and then ceased. In a few minutes it would begin again, as before, and so on indefinitely. As it did not yield to the former treatment, the patient was given morning and night for a few days a capsule containing, each, gram. 0.12 (grains 2) of the powdered extract of the suprarenal glands, with the happy result of rapid disappearance of the annoying tinnitus. Whether this was due to the

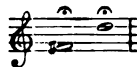
medicine alone it is impossible to say, but similar good results in numerous other cases have led me to have some faith in its efficacy as an absorbent of tympanic effusions.

Soon after, another patient came complaining of tinnitus, although with but very slight, if any, deafness. Although he had no musical education whatsoever, there was no difficulty in getting him to locate upon the piano the note corresponding with his tinnitus. He picked out this note as marked on the staff :



which you may call *a*, but without any overtones as in the other case. The use of Siegle's speculum producing rapid massage' of the *Mt*, without, however, using any greater force than could be produced by the puffing in and out of the buccal muscles, soon reduced the tinnitus, which seemed to be due to relaxation of the *Mt*, rather than to any possible accumulation within the tympanum. I then made the following curious discovery which is not mentioned in accessible literature. If I made the last movement of the massage with suction, and then withdrew the speculum, the tinnitus ceased. If I again introduced the speculum and blew into the meatus, the noise returned, showing that the inward deviation of the *Mt* excited the tinnitus, whilst the outward caused it to cease. This is a nice point to remember, and shows that the use of massage by the lips alone has some advantages over coarser, mechanical movement by various sorts of motors.

If you will permit me to offer myself as a patient I will locate my tinnitus, day in and day out, as *f*², or, as notated musically,



with occasional intromission of the overtone *d*¹.

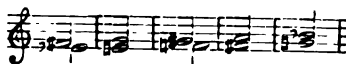
Gustav Brunner was the first to call attention, years ago, to an observation of the usual low-pitched tinnitus being interrupted by a higher tone, suddenly piercing through and

overclouding it, so as to make the original hardly perceptible. The same phenomenon in my own ears, I would like to describe more accurately in these words: Without the least warning, and without the necessary presence of a "cold" in my head or nostrils, the right ear will seem to close as if with a bubble of air, the tinnitus in the left ear will cease, the right ear will feel as if frozen and standing away from its attachment, and then out of that benumbed congestive vacancy arises a delicate high note of about the same pitch as the original tinnitus in the left ear, only three octaves higher—*f*^{##}—and written thus:



Sometimes this high note is a semitone higher, that is to say \equiv *g*, yet at the same three octaves above the original tinnitus. The phenomenon hardly ever lasts more than two minutes, whereupon the bubble bursts, as it were, the high note fades away, the right ear resumes its usual sensation, whilst the old tinnitus on the left side becomes again interminable.

Several years ago the tinnitus, after exposure to a loud mechanical noise, ceased for two or three days, but in the interval on playing any instrument the notes lying near the original tinnitus were reduplicated, as here below; the lower row, *e*^b, *e*, *f*, *f*[#], and *g*, showing the notes touched, the upper, *f*[#], *g*, *g*[#], *a*, *a*[#], the notes as they sounded:



then from *a*, or, as I prefer, upward, there was no double hearing.

Panse, in the paper referred to before, printed a single instance of musical notation, and as it did not appear in the English translation it may be placed here, because it gives an exact idea of the location of the tinnitus, and differs from

most authenticated cases in being a repetition on three notes.



Let me next mention that some patients are very sensitive to the note corresponding to their tinnitus, whilst others are pleasantly affected. Urbantschitsch mentions a musician who perceived a tinnitus on d''' , but in order to hear that note on the piano it was necessary to hit it hard and it sounded harsh. On the contrary, we find those who hear the note corresponding with their tinnitus clearer, and are sure that it is easier to perceive than any other note on the keyboard. Investigation of this phenomenon may lead to something useful for localization or treatment of tinnitus, as will be mentioned farther on. Thus, for example, the sensitiveness of the ear to the given tone may suggest tympanic effusion or obstruction in one case, whilst the pleasurable reception of the tone in another ear may suggest labyrinthine disease.

After finishing this paper, I was much pleased to find at hand an illustration of my suggestion. Dining one evening in Washington, chance threw me alongside of a cultured violinist, to whom I communicated the theme of this paper. He then told me that some years ago he put cotton into his ears before surf-bathing, but took it all out, as he imagined, on coming from the water. On the next day, however, and for more than four years afterward he suffered from a tinnitus in one ear, and whenever during all that time he played on his violin the note corresponding with the pitch of the tinnitus, he felt a most disagreeable sensation in the ear. When he finally consulted a skilful aurist and had a bit of cotton removed from contact with the drumhead, where it had remained for four years, the tinnitus ceased, and with it the sensitiveness of the ear to the corresponding tone when sympathetically vibrated by the violin.

This then induces me to bring forward the theory that, if

the perception of the tone of the tinnitus is pleasant to the patient when sympathetically vibrated by musical instruments, the tinnitus is labyrinthine; if unpleasant, harsh, and sensitive, then the tinnitus is due to obstructed conduction, foreign bodies, cerumen, tympanic effusions, etc.

Those of you who are musical and attend the concerts of the Boston Symphony orchestra when it is in New York may have heard some of the noble symphonic poems of the Bohemian composer, Smetana, a man so renowned at home that when he resigned the conductorship of the opera house at Prag, on account of deafness, he received medals, money, and the freedom of the city. If you have not heard his music, go at the first opportunity.

Smetana, after losing his hearing, composed a string quartette entitled "*Aus meinem Leben*" ("*Scenes from my Life*"), depicting in the first movement the happiness of youth; in the second, love and marriage; in the third, out-door Bohemian life; and, in the last, a contemplation of his life, with suggestive themes from the former movements. Just before bringing the quartette to a close, the cello and viola suddenly begin a tremolo,



and from those deep notes arises upon the high strings of the violin the prolonged note \bar{e} , which, Smetana in his program tells us, is his original tinnitus, premonitory of his later deafness. This is the only program music of tinnitus with which I am acquainted. Beethoven has similar passages, but he never said that he meant by them to indicate tinnitus or approaching deafness.

Anything that can diminish tinnitus will go far to relieve one of the grievous burdens of humanity. Patients often say that they can endure being deaf, but that the noises spoil their lives. Passing by the classical allusion to the patient who committed suicide on account of tinnitus, which

must have been the hallucinations of a weakened mind, there can be no doubt that subjective noises are distressing, to say the least. There is but one brightness amidst the gloom, and that is when in the silent watches of the night you dream of conducting vast orchestras with an innumerable host of listeners through wonderful compositions, only at last to awake to the dreary discovery of your constant companion—tinnitus. Your melodies, just before perceived, were echoes alone of that.

It is not worth while to linger upon the presentation of the musical aspects of tinnitus, and they have only been mentioned to show that to discover the pitch and to note it musically are not difficult. What I would like to see is notation, as here given, in every case of tinnitus. The expense of printing may be greater, but you can demonstrate to the eye a tinnitus so much plainer by a visible note than by the other methods, such as c , c^I , c^{II} , c^{III} , etc., or c^1 , c^2 , c^3 , c^4 , or \bar{c} , $\bar{\bar{c}}$, $\bar{\bar{\bar{c}}}$, or, in the case of lower notes of \underline{c} , $\underline{\underline{c}}$, $\underline{\underline{\underline{c}}}$, that the question of expense ought not to be considered too great a sacrifice in the direction of scientific lucidity.

Furthermore, the piano keyboard method of ascertaining the position of tinnitus is so much more scientific than by forks, unless one has a complete and costly set from semitone to semitone, that the two can hardly be mentioned in the same breath.

Additionally, it should be urged that if this testing is attempted it should be done with the patient's head erect, as well as bent forward, backward, or to one side, especially in the presence of undoubted tympanic accumulations.

In the treatment of tinnitus, let me mention unusual methods; the old ones are too familiar to repeat.

Ergot used hypodermatically or into the substance of the muscle (preferably over or into the deltoid) is often beneficial. Fifteen minims (to be increased gradually) of Squibb's extract in a formaline solution (1:1000) act happy at times. This dose can be repeated daily or every second day. It has been claimed that the injection of strychnia into the temples acts more efficaciously in cases of optic

atrophy than when injected indifferently into the system hypodermatically. If you believe this, then you may inject the ergot into the skin over the mastoid process or in front of the auricle.

Glycerole of iodine applied over the mastoid process, and especially in the fold of the skin at the attachment of the auricle, is worth trying. This solution can be made by distilling an ounce of pure iodine in twelve ounces of alcohol over a sand bath and adding to the residual fluid four ounces of glycerine. This is much more valuable as a counter-irritant than many of the external applications—such as olive oil and chloroform, and the morphia mixtures of the text-books. Iodine, five-per-cent. solution, in glycerine, is equally useful.

Electrolysis against and through the labyrinthine windows, *via* the *Mt*, might be of great use if we could discover a trustworthy local anæsthetic. Aniline oil and alcohol, equal parts, with five per cent. of cocain, serve admirably in some cases. With perforation, this should not be applied too abundantly.

Lucae's pressure-probe is another mechanical agent worth trial oftener than seems to be the case in America.

Hypnotic suggestion is something that should also be utilized a great deal oftener in tinnitus than at present. I believe that there is a wide field for its employment in this distressing symptom.

Bougies into the Eustachian tube do not appeal to me for aural treatment of any sort. The sensation produced, like unto being lifted off of the floor by a hook inserted beneath the ear, as I know it, is something not to be recommended to patients. I have often wondered if the bougie-sensation were not a good deal like the hit on the point of the jaw just before it knocks you out.

There are two ways of utilizing hot air for the treatment of tinnitus. The one with a little cylinder filled with charcoal and heated by an alcoholic flame, or with a similar cylinder heated by a galvanic lamp, has not seemed to me successful. On the contrary, the application of heat to the auricle, side of the head, and into the meatus by means of a

stove with funnel and sleeve to cover the ear has helped two recent cases greatly. In one, especially, there were all the symptoms of Ménière with profound deafness and vertigo, in which the use of hot air daily by the stove improved the hearing more than one half and entirely relieved the vertigo in the course of six weeks, after many remedies had been tried in vain for as many months. With the cylinder apparatus the patient is tied down to daily visits to the doctor, whilst with a stove for each case more regularity is obtained at home. If the patient must be under close observation, visits to the medical adviser can be made as often as needed. Hot air applied into the ear in this latter way is a distinct advance in otology and in the treatment of tinnitus.

A manufacturer in our city makes a handy atomizer for albolene solutions. By using this as an inflator, instead of the usual Politzer Bag, vapors can be gently forced into the middle ear as the patient swallows. Most of my patients get one of these and use it at home under proper instruction. Chronic cases find this more helpful in relieving the tinnitus than any other method.

Thiosinamine is unstable; yet it may be tried. It ought to be used more often daily than once, as advised in literature, if any effect is desired. Most people find no trouble in taking a grain or even two, three times daily, about an hour after meals.

Personal experience is always useful, and for the last time speaking personally, the late James Hinton relieved for me an annoying tinnitus by perforating the *Mt*, and syringing soda-bicarbonate through it into the naso-pharynx. The operation, without an anæsthetic, was not very painful. The worst sensation was a frozen feeling at the tip and one side of the tongue, when the knife approached the chorda tympani. That tinnitus never returned, and the hearing was not injured.

Massage, as was mentioned before, can be more scientifically applied by the motion of the lips and tongue, than by mechanical motors, and is a useful aid in some cases of tinnitus.

The fact that the application of the galvanic current through the auditory nerve causes a tinnitus which varies in pitch in different persons, suggests its more exact use in the treatment of this affection. Discover the special intensity which produces certain notes in normal ears; then utilize that intensity in abnormal ears with a similar pitch of tinnitus.

Finally, an observation which I have made, that the exposure of an ear with tinnitus of a certain pitch to the prolonged action of the tone of an organ or reed pipe or violin string of the same pitch diminished and even removed permanently for a certain length of time the disagreeable subjective sensations, seems to open a new field in the treatment of this obstinate affection. This observation has been one of my principal reasons for bringing again before this Society the question of tinnitus, with a view to a more accurate and scientific localization of the pitch, combined with a more striking musical notation than has been commonly employed. It is only by leaving the old ruts and trying other methods that we may in time do better work in a series of mostly hopeless cases of tinnitus. Let younger men with good hearing and some musical education study their cases more carefully, and they may look forward hopefully to doing more efficacious work than their predecessors have done. For if it is true, as Zaufal has suggested, that there is a certain set of auditory cells more easily affected by irritations than others, what those cells are, and where they are situated in the labyrinth cannot be more probably discovered than by studying and investigating their location-pitch as exhibited by their tinnitus when they are irritated.



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THE UNIVERSITY CLINIC FOR DISEASES OF THE EAR AND THROAT IN ROSTOCK.

BY THE DIRECTOR, PROF. O. KOERNER.

(With appended Plates XI. to XIII., Vol. XXXVI., *Zeitschrift f. Ohren-
heilkunde.*)

THE clinic is built so as to face the south. On the west side there is a separate entrance for the dispensary patients. The main entrance is on the east side.

In the **basement** there is a room for storing the clothes of the patients, who put on the ordinary hospital wash clothing directly after the bath ; closets, heating-apparatus, and coal-bins. The heating is the low-pressure steam system. There are two furnaces of which each can be used alone. In connection with this heating-apparatus, there is a boiler for hot water which supplies hot water to all the floors. There is another boiler for the hot-water pipes to be used in the summer. In connection with the heating there are pipes which convey the heated air to all the rooms and shafts which carry away the exhausted air. The illumination is electric ; the medical apparatus for illumination, trans-illumination, and galvano-caustic are in connection with the general electric current. Gas is only used for the sterilizers in the small rooms next to the operating-room and in the dispensary, the laboratory, and the kitchen.

The **corridors and stairways** are so arranged that daylight is admitted to all corners. The **halls** are unusually large and can be used as day rooms for patients, and also for the purpose of functional examination of the hearing. The staircase is of iron with oak steps.

The **ground floor** contains the dispensary rooms in the centre. The entrance leads into an anteroom which divides the dispensary proper and the waiting-room. This room serves for a cloak-room.

Next to the dispensary room there is a **dark room for trans-illumination** and a **room for dressings**. The dispensary is also used as a lecture room. There are further a bath-room and **laboratory** with a **museum of normal and pathological specimens**. Two rooms are assigned to the **director** (executive surgeon) which include a library. The residence rooms of the **first-assistant** are also on this floor.

A **large wing** contains the **operating-room** and a **number of adjoining small rooms**. The floor is of mosaic. The operating-room is furnished with a broad window looking north, reaching to the ceiling.

The two rooms over the operating-room are the **children's wards** and a **room for the nurses**. Each ward contains eight beds. There is a large space which can be used as a play-room. The large room over the **dispensary** is the **male ward**. This has room for eight beds. The rooms over the laboratory are the **female wards** and contain four and two beds. The remaining **five rooms are for private patients**. The furnishings are very simple but substantial. In the top story there are **isolation rooms** and **rooms for the help**. In a southerly direction there is a **garden 50 x 15 metres** which can be used as a play-ground. On the north side there is another open space four times as large, which also serves for a garden.

THREE CLINICAL COMMUNICATIONS TO OTOLOGY.¹

By EMIL AMBERG, M.D., DETROIT, MICH.

I.—ADDITIONAL REMARKS TO THE REPORT OF A CASE OF SCOTOMA AURIS PARTIALE CENTRALE ET PERIPHERICUM.

THESE remarks constitute a supplement to the case reported before the Wayne County Medical Society, November 20, 1902, and published in the *Journal of the American Medical Association*, January 17, 1903.

February 25, 1903. — After catheter: Both drum membranes retracted in their totality; convex, like the segment of a globe, toward the promontorium. Hearing for low tones diminished, especially on left side.

$\frac{2}{100-150}$ (i) Watch $\frac{1}{100-150}$ (i)

After using Lucae's pressure probe: $\frac{2.5}{100-150}$ (i) Watch

$\frac{1}{100-150}$ (i)

Examination with Siegle's speculum does not reveal anything unusual.

DRUM MEMBRANES.

Right Ear.	Left Ear.
Surface smooth.	Smooth.
Inclination: Totally convex towards promontory.	Inclination: Totally convex towards promontory.
Thickness: Seems not abnormal.	Same as in right ear.
Color: Gray white.	Same as in right ear.
Light reflex: Trace at umbo.	A trifle more than in right ear, but also only trace at umbo.

¹ Read before the Eye, Ear, Nose, and Throat Section of the Wayne County Medical Society (Michigan), April 27, 1903.

Patient reported later that on February 28, 1903, heard watch better when watch was higher. Thinks that she heard exceptionally well that day.

Says that on March 2, 1903, her hearing was not so good, and she heard the watch better directly opposite the ear. She also says that people at home laughed at her because she misjudged direction of sounds.

Patient also reports that in September, 1899, she met with an accident, when a candle, the weight of which she thinks was about fifty pounds (in church), struck left ear; she fell about three feet. Was taken up unconscious, but regained consciousness immediately. Did not notice anything particularly wrong about herself.

Hearing for the watch, March 15, 1903, after catheter: $\frac{3.50}{100-150}$

Watch $\frac{1}{100-150}$

After publication of this case in the *Journal of the American Medical Association*, my attention was called to the literature of similar phenomena by a colleague in the East. The *Monatsschrift fuer Ohrenheilkunde* of February, 1872, contains a *résumé* of an article by Urbantschitsch. Urbantschitsch describes three deaf points which presented themselves when hearing tests were made with a tuning-fork. In the same journal of May, 1872, Dr. Emil Berthold, of Koenigsberg, speaking of the deaf points of the ear found by Dr. Victor Urbantschitsch, comes to the conclusion that there do not exist any deaf points of the ear. Already Dr. Pleischl had remarked that the cause of the phenomenon did not lie in the perceptive organ but in the sound-producing outer object. Politzer found that examination with a watch never led to discovery of deaf points.

Concerning the ability of determining from what directions sounds emanate, I quote from Anna Tomaszewicz's inaugural dissertation, *Beitraege zur Physiologie des Ohrlabyrinths*, Zurich, 1877, chapter vi., "Examination of the Judgment of the Direction of Sound": "The experiments were carried out either in ordinary environments with closed eyes, plucked-up ear canals, or covered auricles, or in a great reservoir of water used for bathing purposes, together with a friend. At an average there was one deception among

thirty-one experiments. Mostly the direction from front was confounded with the direction from behind, especially if the sound was not sufficiently intense. This occurred more rarely under water than out in the air."

Jones and Stewart, in their text-book, *Diseases of the Ear*, fourth edition, Ballière, Tindall, & Cox, London, 1892, say in the chapter "Testing the Acuteness of Hearing":

"In the same lecture Dr. Ogston says: 'I do not think a better illustration could be given of the imperfection of our methods than the fact that it is not generally known that the field of hearing of a normal ear has its limits in lateral directions, and that points of greater and less acuteness exist in it. If a person be seated with his ear horizontally directed towards a watch or other source of sound, and at such a distance from it that he can just distinctly perceive it, it will be found that as he inclines his head in various directions the sound becomes more or less distinct, and at certain limits of inclination inaudible. As an instance of this, I may give the measurements taken in the left ear of one of my patients, who suffered on his right side from the labyrinth disturbances I have described, but in whom the left ear was normal. When the imaginary line joining his two external auditory meatus, which I may call the meatus line, was directed horizontally, and a watch was placed in the prolongation of this line at a distance of ten feet from his good ear, at which point he could just distinctly hear it, it was found that when he rotated his head for fifteen degrees towards his back—that is, in a horizontal plane backwards—the watch was heard at a distance of fourteen feet, or, which is the same thing, if his head remained stationary while the watch was moved forward to a situation fifteen degrees in front of the meatus line, it was there heard at a distance of fourteen feet. It was, of course, immaterial to the result, whether the patient or the watch was moved. In testing further, it was found that if the watch were moved forward to an angle of forty degrees in front of the meatus line it was there heard only at six feet, and at fifty-five degrees only at three feet. The back part of the field showed a slow decrease of the range of hearing, the watch at twenty-five degrees backward being heard only at six feet, and at forty degrees backward at five feet, beyond which the range fell to three feet and less. So that the patient's field of hearing embraced only ninety-five degrees of a circle, its point of greatest acuteness

being fifteen degrees in front of the meatus line. The diagram will render this more intelligible. It corresponds to several other measurements I have taken of normal ears, and is, I think, a tolerably accurate representation of what is usually found in health; although the conditions under which I had to work when examining all these cases, particularly as regards noise and currents of air, were unfavorable to perfect accuracy.

“‘When the hearing in the vertical plane was next examined, it was found that here also the sound was not best heard when opposite the meatus. It was there audible at ten feet, while at fifteen degrees above the range diminished to eight feet, forty degrees above to six feet, and sixty degrees above to three feet and less; but below it slowly increased for thirty-five degrees, at which point it reached twelve feet, diminishing then to ten feet at forty degrees, and to three feet and less at fifty degrees, as shown in the diagram (Fig. 20). The point of most distinct hearing is, therefore, below the ear.’

“In this connection I may mention the symptoms in a patient of mine, Mr. O. H., twenty-three years old, who consulted me in mid-winter, 1901-1902, on account of an acute simple catarrh of his left middle ear, improving under catheter treatment, necessitating, however, later on, a paracentesis. This patient could hear considerably better when he held his head towards the left shoulder, which improvement, in my opinion, could simply be attributed to the change of the position of the exudate in the middle ear.”

It may be suggested that the phenomenon in our first case might be due to temporary fatigue. We know that the same patients during the time of testing respond to the same test sometimes entirely differently. This explanation seems, however, rather improbable. It would seem that the changing conditions of the middle ear and their possible influence on the membrana tympani are of consequence in regard to the phenomenon. Whatever may be the cause, the clinical picture should invite investigation along the same lines.

II.—SYNCOPE AFTER DEEP MANUAL PRESSURE ON LEFT SUBAURICULAR REGION AT THE ANGLE OF THE JAW.

Mr. J. F. R., of Detroit, aged sixty-eight, consulted me on recommendation of his family physician on February 27, 1903, com-

plaining of three different kinds of noises in his left ear. One day, in the course of treatment, I compressed the left carotid artery with my right hand, placing the thumb on the artery at the angle of the left jaw, exercising counter-pressure on the vertebræ with the four other fingers. While doing so the patient's face became suddenly white, and his head fell over on his chest. I immediately laid him on the floor, but he came to even before I had made him comfortable.

I asked the patient, a very intelligent man, whether he felt bad. He said that, on the contrary, the sensation was a very pleasant one, just like going to sleep. One of the next days the patient asked me to show him the spot where I had exercised the pressure. I showed it to him. Then he told me that just before going to sleep he was retarded somewhat from doing so on account of the noises in the ear, and that he then should like to press just a little on that spot. Considering the age of the patient, I advised strongly against any such manipulation on his part, especially after the occurrence in my office—although another patient of mine (female) used compression, with some temporary benefit, against the noises.

It was suggested to me to see whether compression of the right carotid artery with the same patient would produce the same symptoms, as there might be changes in the right carotid artery, placing more demands than may ordinarily be the case on the left carotid. I confess that, in spite of my curiosity, I do not feel like attempting to try the experiment. It is not impossible that the syncope may also have been caused by pressure on the sympathetic nerves.

Patient was referred back to the family physician.

April 18th.—Patient feels generally better. Although there is still some "drumming," the condition is better, and he hears only "one set of noises."

III. — TRAUMA TO THE HEAD, SHOWING SYMPTOMS OF AFFECTION OF RIGHT INNER EAR.

Mrs. D. L., fifty-seven years of age, while visiting in Detroit, was referred to me for consultation. The patient tells the following story:

Fifteen years ago she caught her foot in a flat-iron which the servant girl put at the foot of a door in order to keep the door open. She fell, striking her head against a pipe on the wall,—

a pipe of about three inches diameter. The portion of her head striking the pipe was the right side of the frontal bone about one-half inch over middle of supraorbital notch.

The door was neighboring a long staircase of about eighteen steps. After the fall on the pipe she lost consciousness and fell down-stairs. After the patient had fallen half-way down-stairs she felt every hit; recovered consciousness, it appears, after falling half-way down. When she arrived at the foot of the stairs she got up immediately, as she says, and felt all right until the second night after the fall. Then, about midnight, patient had a dizzy spell, thought that whole bedstead was going to the left. Called to husband: "Hold me! I am falling!" She also had a feeling as if sinking down in bed.

It took two days before she was able to stand on her feet. Felt very miserable for two days. If anybody spoke behind her back, she could not turn around. When she turned to the left side the feeling of dizziness appeared, but she could turn somewhat to the right. She says that a physician gave her a heart-tonic, and she thinks that she suffered from shock owing to the fall.

Eight or nine years ago the patient, while driving, was thrown out of a carriage; fell on her legs, and thinks right leg now weak. One winter night, about three years ago, imagines that she got a draught. Head felt just as if paralyzed. Could not lift head. Daughter thought that patient was going to die, because she felt weak and could not rise.

As soon as patient exerts herself her head feels big. In winter time dizziness worse. When son lifted her up he had to promise to hold her tight.

When patient was in New York, February 5th-22d, she had dizzy spells on two occasions. She felt sick if not left quiet on pillow. Some months ago, when her daughter lifted her up quite rapidly from a reclining position patient vomited. So long as she has been in Detroit (April 12, 1903), for about two months, she had no dizzy spells. Polyuria when dizzy spells took place.

One night some weeks ago a tachycardiac attack occurred, after her description, for about three minutes, which she attributed to digestive troubles. Noises like "steam escaping" in right ear all the time, especially when lying down or when exerting herself. Noises are constant and of different tones. At times, when turning to the left, she feels faint.

Status: Moderately stout lady of healthy appearance. Depression on right side of frontal bone about one-half inch above supraorbital notch.

The examination of the ear gives very little information. Low and high tones are heard on both sides, and a very great difference for voice and watch does not exist. A low fork, she says, is heard much fainter in right ear. "99" whispered, heard at a distance of about fifteen feet in right ear; "81" whispered, heard in left ear at a distance of about eighteen feet. $C'=256$ fork, when held directly behind auricle on mastoid in the height of upper wall of meatus, heard not so long in right ear as in left ear.

Blake's fork 512 VS, heard 6-7" by bone-conduction. Same condition in both ears. Galton: 0.0 right ear; 0.35 left ear. Weber lateralized on right side. Rinne positive on both sides. No nystagmus. Both drum-membranes are somewhat retracted, and no light reflex is visible. Noises: All the time hissing noises, of different tones, in right ear, especially when lying down. When a draught strikes her neck, and when she lies down on anything that shakes, she feels dizzy. Even now, at times, she has the dizzy feeling when she turns to the left. When she turns her eyes up, she feels as if she were going to fall, and she says she can never look up high. Even now, she says, she does not dare turn to left side; if she tries, she feels like getting unconscious. She can turn to the right side only by degrees. Every time when she gets dizzy she has a desire to urinate.

Some nights she had to hold herself in order to assure herself that she was in bed. She thinks it is partly imagination. When it is dark, she thinks, it is worse.

Never had any headache, although, as mentioned before, head felt big like a "bell," and dull. She imagines that there is a blood clot or a piece of bone somewhere on the brain about one inch above right auricle.

The family physician, in Detroit, reports that there does not exist any organic heart lesion at present, and there is no sugar or albumen in urine.

In reviewing the case we have prominently before us the following points:

1. Patient says that she never had any symptoms on the part of her ears before she met with an accident fifteen years ago.

2. An injury to the right side of the head ; depression on cranium.
3. Disturbances on the part of the ear dating from the time of accident.
4. Noises in the right ear.
5. Somewhat shortened bone-conduction for $C^1 = 256$, compared with left side.
6. The occasional feeling of faintness when turning to the sides, especially the left.
7. Disturbance of equilibrium when looking up.
8. The feeling of nausea when suddenly raising herself in bed.
9. The feeling as if sinking down in bed at time of accident.
10. Polyuria during attacks.

Some light is thrown on lesions of this character, and of other origin, by Dr. Loewenberg in his article, "D'une forme particulière de vertige auriculaire." Extrait du *Bulletin Médical* des 26 et 30 Août, 1891 :

"In so far as true diseases of the nervous system are concerned, it is scarcely necessary to remember that a shock which suffices to provoke grave and lasting disorders with some people can leave unhurt individuals with stronger nerves and less great impressiveness. . . ."

". . . Among the victims of a railroad disaster, some experience only a more or less great fright, whereas others affected with a constitutionally defective nervous system, especially hysteria, become attacked by traumatic neurosis (railway spine and railway brain), spinal and cerebral troubles caused by the accident."

He speaks of the acoustic hyperæsthesia without disturbances of the equilibrium. "It seems," he says, "that with these individuals the cochlear branch of the acoustic nerve is affected, not however the vestibular branch, which governs equilibrium." He further states that if those generalities are not satisfactory he could suppose an excess of tension in the cerebro-spinal fluid or a certain narrowness of the aquæductus cochleæ.

Dr. Stenger, in the *Berliner klinische Wochenschrift*, No.

5, 1903 (February 2, 1903), speaks of the importance of considering the ear in traumas to the head, and I refer you to his article, "The Value of Otitic Symptoms as to the Diagnosis of Injuries to the Head, in Particular Basis Fracture," as justice can only be done to it when extensively quoted.

The following may be regarded as affections which may attract our attention prominently while deciding about the nature of the injury and subsequent disturbances in our patient:

1. Affection of the cerebrum, the cerebellum, the medulla, and the dura.
2. Meningitis.
3. Lesion in the origin, course, and distribution of the acoustic nerve.
4. Lesion of the organ of equilibrium.
5. Lesion of the perceptive apparatus proper of the inner ear.
6. Narrowing of the aquæductus cochleæ.
7. Lesion of the middle ear.
8. Ménière's disease.
9. Traumatic neurosis.
10. Affections of other organs (heart, stomach).
11. A combination of some of the before mentioned affections.

SUPPLEMENT: July 24, 1903.—The patient reports that she has not had the feeling of faintness when turning sideways since December. Also the disturbance of the equilibrium when looking up did not appear since last winter. While she could not lie on an elastic sofa when she came to Detroit, she is able to do it now, and she does not become nauseated when she raises herself suddenly. The patient thinks that the summer always agrees with her better.

REPORT OF THE MEETING OF THE GERMAN
OTOLOGICAL SOCIETY IN WIESBADEN,
MAY 29 AND 30, 1903.

By DR. HARTMANN.

The President, Professor KOERNER, opened the meeting and brought to the memory of the Society the names of Drs. Schwendt and Kieselbach, who had died during the past year. He further stated that otology was slowly making its way to a similar position with the other special branches. A new ear clinic has been opened in Heidelberg, and the second full professorship in otology in Germany has been established.

The number of members is now 279. The library has received numerous additions.

Berlin was chosen for next year's meeting; Professor LUCAS to be presiding officer. Professor SIEBENMANN will read a report on the anatomy of deafmutism. Dr. HARTMANN's proposal that a composite work on the anatomy of deafmutism be issued by the Society was accepted.

1. DENKER reported on **stapes-anchylosis**. After a short historical survey of the cases of bony stapes-anchylosis which had appeared up to the year 1885, the speaker said that in that year our knowledge of stapes-fixation had been considerably furthered by the publications of Bezold, as this author was able to examine anatomically a case which had been studied clinically, and showed that fixation of the sound-conducting apparatus caused a negative Rinne. With aid of a large number of illustrations, the histological changes in the stapes, in the annular ligament, and in the labyrinth capsule were demonstrated and the results of these examinations explained.

In all cases of bony stapes-fixation, the normal bony structure of the stapes and of the bone surrounding the niche of the oval

window were converted into osteoid, then rarefied, tissue. In some cases the annular ligament was completely converted into new-formed bone, while in other cases the stapes was connected to the window-margin by osseous bridges.

As regards the starting-point of the bone disease, there are two possibilities. The beginning of the bony process may be secondary to a previous inflammatory condition of the middle-ear mucous membrane, or the disease may begin primarily in the bone or periosteum. According to the author, it seems quite probable that a middle-ear affection can lead to an ossifying peristitis and cause the transformation into bone, and he thinks that this is quite probable on account of the frequent association of the two morbid processes.

This, however, leaves unexplained the origin of the rarefying process in those cases where no change is found in the tympanic mucous membrane which can be regarded as the residue of preceding inflammations. In these cases a primary disease of the periosteum or of the bone seems to be reasonable. A number of cases where isolated foci were found in the cochlea, which were not in connection with the other areas and did not extend to the tympanic mucous membrane, make it probable that rarefaction may take place without affecting the periosteum. In general the new-formed bony tissue has extended to the periosteum of the tympanic cavity or to the vestibule.

The question of the etiology of this rarefying process in the labyrinth capsule is partly answered by statistics, which show that bony stapes-anchylosis usually occurs in women, where the disease appears to originate with pregnancy or the puerperium. As is well known, ear disease in general affects the male in three-fifths of the cases and the female in only two-fifths. This, however, only explains some of the cases, and the author agrees with Katz and Schwartze, who assume that a constitutional anomaly must be present. This latter view is favored by the fact that the disease usually develops simultaneously on both sides, and that the degree of deafness in many cases is the same on both sides.

The diagnosis of the uncomplicated stapes-anchylosis is not difficult, given the history, the objective and functional examinations. If the Eustachian tube is patent and the picture of the drum-membrane is normal, the diagnosis of stapes-fixation is probable when the functional examination, in the presence of decided diminution of hearing for speech, shows the symptom-

complex of Bezold—shortening of the lower tone-limit, prolongation of bone-conduction, negative Rinne. The cases where this clinical picture was present have at autopsy always confirmed the diagnosis.

In regard to the treatment the author thinks that all local treatment, from the simple Politzer douche to extraction of the stapes, has given such poor results that its employment cannot be recommended, especially as the condition has been made worse by treatment in some of the cases. The very annoying subjective noises in some cases where other means have failed have been favorably influenced by electromotor massage of the drum-membrane and even caused to disappear for a greater or shorter length of time.

2. PANSE demonstrated **microscopic specimens** and drawings of cases which had been examined functionally and of the ears of two deaf-mutes.

3. BEZOLD: The **hearing examination with tuning-forks in unilateral deafness** and the deductions which can be drawn therefrom for bone-conduction and the function of the sound-conducting apparatus.

Bezold showed six years ago that the hearing remnants found in cases where the labyrinth had been destroyed on one side were an exact picture of the hearing of the other ear, which could not be excluded in examining the upper portion of the tone scale.

As this picture is a definite reproduction of the hearing of the other ear, the diagnosis of one-sided deafness no longer causes any difficulty. The author described the result of examining the patient with a defective labyrinth on one side with a continuous tone-series to show the presence of a direct bone-conduction of air sound-waves through the bone to the labyrinth, and concludes that such a direct conduction does not exist, and that there is no hearing for the lower half of the tone scale without a tympanic membrane and an ossicular chain, and that in the case of the upper part of the scale the sound waves are transmitted to the labyrinth by vibrations of stapedial foot-plate.

4. WANNER spoke on the **functional examination in labyrinth necrosis and one-sided deafness**, a contribution to the diagnosis of labyrinth suppuration and one-sided deafness.

The report consists of 27 functional examinations of 22 patients. In 50 % of the cases labyrinth-suppuration was the cause

of one-sided deafness. In 2 a labyrinth-sequestrum had been exfoliated. In the other 11 cases primary disease of the inner ear was present in 3.

The hearing charts of the two cases of labyrinth-necrosis were described. In one of these, in which the other side was perfectly normal, the continuous increase of the hearing perception, from the lowest to the highest tones which are perceived by the deaf ear, was present, as has already been described by Bezold in labyrinth necrosis. The lower tone-limit was *d* sharp, the first unloaded tuning-fork to be perceived was *c*; then the hearing perception for the various tones diminished.

A similar condition was found in the second case. Though corresponding to the defect in the hearing ear, the hearing perceptions on the deaf side were in general very much shortened.

The average of the hearing charts in six cases was demonstrated where, according to the tests of Lucae-Dennert, one ear was deaf for speech and the other ear was practically normal. This average agrees with the conditions found in the aforementioned first case, and the function of this ear, deaf for speech, was completely destroyed. The amount of hearing perceived by a deaf ear depends upon the hearing ear. This is especially well shown in cases where the hearing ear presents large defects.

The diagnosis of one-sided deafness can be made when

(1) In the examination of the hearing duration the above-described continuously ascending condition from the lowest to the highest perceived note is present, and when by marked diminution for some tones on the hearing ear a corresponding diminution or absence is found for the deaf ear.

(2) For the case when the middle tone of the scale *a*¹ of 435 double vibrations is no longer perceived per air.

(3) When the voice is not perceived or, as in the Lucae-Dennert test, the hearing is the same when both ears are closed as when the deaf ear alone is open.

(4) When the lower tone-limit is situated in the small octave or in its neighborhood, though never lower than *d* sharp.

(5) When Weber's test with *A* and *a* is transmitted to the healthy ear; and

(6) When Schwabach's test is abbreviated.

5. **LUCAE:** On the **relation of tone hearing to speech hearing**. The following case confirms the recently published observation of the author that perception of the most important

musical tones is only of value to voice hearing when these are perceived as such and not as noises :

A musical man, twenty-six years old and otherwise healthy, was always hard of hearing on his right ear, and seven years ago after a cold bath lost the hearing for voice on his left ear with constant tinnitus. Objective condition of both ears was negative.

Right: whisper at ear fork c' per air = $\frac{8}{16}$; fork c per bone = $\frac{1}{16}$; c air = $\frac{3}{16}$; c^2, c^3, c^4 , and c were perceived as musical tones; C and contra G uncertain whether as noises or not.

Left: loud voice heard as individual sound; c' air = $\frac{8}{16}$; c not determinable on account of tinnitus. All tones from c^2 to c as tinnitus: C and contra G not perceived.

The unquestionable labyrinth disease was treated with a pilocarpine cure; whisper on right side improved, numbers were heard at 0.6m. The right ear was treated with the pressure probe for four months. Then whisper in 2m; c bone = $\frac{1}{16}$; c air = $\frac{3}{16}$; but c' unchanged = $\frac{8}{16}$. The improvement after treatment with the pressure probe is explained by the presence of an associated right-sided disease of the sound-conducting apparatus. To support this a case is cited where with a positive Rinne the autopsy showed a diminished mobility of the stapes from rigidity of the annular ligament.

6. OSTMANN: On the **amplitudes** of Edelmann's C and G forks as **objective, uniform hearing measure**.

All investigators who have examined the objective, uniform hearing measure have found it essential to determine experimentally the curves of cessation of the unloaded C and G forks from the large to the 4-crossed octave.

Ostmann has succeeded in solving this problem for the latest Edelmann's forks and so that those amplitudes not directly examined could be determined by interpellation.

The curves of cessation of the forks C, G, c, g , could be measured to the point of the threshold value, but in the higher forks a part of the curves were unmeasurable on account of the smallness of the amplitudes. With aid of the law of the normal threshold values, these curves could be completed to the point of normal amplitude, and thus the question was completely solved.

The curves of cessation were demonstrated on an enlarged scale, 40:5000 to 1. By means of these curves, tables of amplitude and hearing tests for the forks $C, G, c, g, c^1, g^1, c^2, g^2, c^3, g^3$, could be

made, which gave for every second of the cessation: (1) the extent of the amplitude; (2) the extent by which the amplitude diminishes compared to that of the preceding second; (3) the number of normal amplitudes contained in the amplitude.

The last statement permits the objective measure of the hearing power of the diseased as compared to the normal ear. The table also permits the representation of the hearing of the diseased ear as a part of the normal hearing, as the hearing power is inversely to the squares of the amplitudes.

7. BENNINGHAUS. A study of sound conduction based on the **anatomy of the ear of the whale.**

DISCUSSION TO THE PRECEDING SEVEN PAPERS.

HINSBERG: Histological examination of infected labyrinths has shown an uneven distribution of the morbid disease, so that it is not unusual that a labyrinth infection does not lead to complete deafness. The presence of hearing islands in deaf-mutes also speaks for this.

KUEMMEL maintains that in stapes ankylosis the local cause should be inquired into—that is, venous stasis in the tympanic cavity.

KRETSCHMANN found in persons suffering from sclerosis the specific gravity of the urine to be increased, with an absence of sugar and albumin.

ESCHWEILER reported on the hearing examination in one case of unilateral deafness. On closing the healthy ear, the lower tone-limit descended from d sharp to d' sharp.

SIEBENMANN says in 100 ear patients there is 1 suffering from stapes ankylosis; the drum membrane in most cases is unchanged; the redness of the labyrinth wall shines through in the region of the oval window.

SCHEIBE: According to statistics, sclerosis occurs more frequently in women than in men. On the other hand, middle-ear disease in general attacks the male more frequently. The cause for stapes ankylosis is not yet known. He would like to ask Siebenmann what the results of his treatment with phosphorus have been.

SIEBENMANN replied that about 50% of his patients had been treated with phosphorus. The result with regard to diminution of hearing had been a very satisfactory one. The dose is $2 \times 10g$

of the Kassowitz solution or $2 \times 1g$ of an oily solution, and must be continued for from 2 to 3 years.

PANSE found osteophytes in the tympanum during the puerperium; variations in hearing may be produced by changeable thickenings of the membrane of the round window.

BLOCH found stapes ankylosis combined with a labyrinth affection in most cases. Occasionally the labyrinth affection is bilateral and the stapes ankylosis is only on one side, which speaks for primary disease of the labyrinth capsule.

SPORLEDER gives phosphorus in larger doses, viz., of 0.02–0.025: 100.0 solution (dose 2 to 3 teaspoons). He reports a very favorable case.

MANASSE has examined microscopically 13 temporal bones with chronic progressive deafness, and found in 2 ankylosis from calcification of the labyrinth capsule; in 8 the labyrinth was atrophied.

8. MOXTER presented a patient suffering from a very **severe middle-ear tuberculosis**. The patient was forty-five years old and at the operation the bone was found destroyed up to the sinus and the dura, with facial paralysis. Recovery took place after a radical operation and the application of concentrated solutions of chloride of zinc. The facial paralysis disappeared.

Discussion.—KIRCHNER has had favorable results with a similar treatment.

9. SCHEIBE: **Deafness in furuncle of the auditory canal.** In furuncle of the canal, deafness may be produced either by occlusion of the lumen or by patent lumen through collateral œdema of the tympanum. This form of deafness in furuncle is not at all rare, though often not recognized. Scheibe has observed 304 cases of furuncle; in these the hearing was tested of 149 cases. Of these, 64 heard not quite normally. In one-half, the hearing distance for whisper was 3 to 6m; in one-quarter, $\frac{1}{2}$ to 3m; and in the remaining one-quarter, under $\frac{1}{4}$ m. The greatest diminution in previously normal hearing was whisper in 20 cm.

The lower tone-limit, bone-conduction, and Rinne's test are similar to acute middle-ear inflammation. On catheterization, the air enters the middle-ear without any râles and the hearing is decidedly improved. Prognosis is favorable.

Discussion.—JOEL believes that the above-described symptoms are those of a simple ear-catarrh.

10. SIEBENMANN brings a contribution on **congenital labyrinth anomalies**. The specimens are very similar to those of

the deaf albinotic cat. The changes can be regarded as compression of the labyrinth vesicle by the bony capsule.

11. KRETSCHMANN: **Formation of bone in the tympanic cavity** of a boy, eleven years old. He had suffered from otorrhœa and abscesses since his first year. A concretion as large as a pea was found imbedded in granulations. A description of the chemical and microscopical examination is added. The name otolithiasis, proposed by Bezold, seems proper.

12. BRUEHL: **Pharyngeal tonsil and auditory organ in idiots.**

Among many interesting details, this author found that 75 % of the idiots suffered from enlarged pharyngeal tonsils; 28 % with enlarged faucial tonsils. The drum membranes were normal in 32 %; 5-7 % suffered from chronic otorrhœa and 14 % from the sequelæ of suppuration; in 306, 36 % heard under 8*m*; 22 % under 4*m*; 20 % heard with both ears under 4*m*. These high figures for enlargement of the pharyngeal tonsil are explained by the idiocy—viz., the carelessness and indolence. Though ear and nose diseases are not etiologically important for idiots, they may be, nevertheless, injurious to these patients.

This is especially evident by the unusually large number of deaf persons in the poorer classes of the idiot schools as compared to the small number in the better classes.

The bodily harm to which the idiots are exposed by their nose and ear troubles should not be lost sight of.

13. MANASSE demonstrated **microscopic specimens of purulent inflammation of the labyrinth.**

14. RUDLOFF: **The course of the sigmoid sinus in the temporal bone of the child.**

According to Macewen, the course of the sigmoid sinus in the adult is shown by a line which connects the deepest part of the parietal incisure of the temporal bone with the apex of the mastoid process. The author can confirm the correctness of this statement after having examined a great number of skulls in the museum at Marburg.

The conditions in the child, however, are quite different and are not mentioned in literature. In the temporal bone of the child, the anterior margin of the sigmoid sinus is posterior to Macewen's line to a varying extent. To explain this course and to show the development of the mastoid process, the author demonstrated five skulls of children of different ages.

15. HÖLSCHER demonstrated the **operating towels** which he had already described, and which, while assuring thorough asepsis, prevent the soiling of the occiput and back of the neck with blood or pus.

16. HAUG: After reporting the twelve cases of **gangrene of the auricle** which are found in literature, the author presents two further cases occurring in two sucklings. They presented very highly developed pædatrophy and gangrene of the auricle. The one child was ten weeks old, and both auricles were symmetrically gangrenous, and there was a large gangrenous ulcer on the right half of the neck. The other child was six weeks old and presented the signs of gangrene only on one side.

The author believes that the condition is due primarily to the pædatrophy, and secondarily to a secondary infection of an eczematous condition of the ear region.

17. FRIEDRICH spoke on **disease of the maxillary joint** from caries of the anterior wall of the auditory meatus.

18. WINKLER describes the exposure of the tympanal tuba ostium in connection with the radical operation.

19. WITTMACK demonstrated microscopic specimens of **acoustic neuritis** with involvement of the cochlear nerve and of the spiral ganglion in tuberculosis.

20. ROEPKE: **Hysteria** as a sequence or accompaniment of **aural suppuration**.

Cases which develop hysteria during the course of otorrhœa are not unusual. A number of factors can be made responsible. The nervous system of a patient suffering from otorrhœa may be damaged through irrigations, cauterizations, and curettings. In a similar way the trephining of the mastoid process and the after-treatment may act injuriously. The important moment for the development of the hysteria is the anxiety of many people suffering from otorrhœa that an intracranial complication may terminate their life. The hysterical symptoms may in these cases simulate intracranial disease. The differential diagnosis is then discussed and five cases are reported; in each, hysteria has set in gradually or suddenly during otorrhœa.

21. HEINE: **Amnesic aphasia and hemiopia in abscess of the right temporal and occipital lobes.**

A man, thirty years of age, with right-sided fetid chronic otorrhœa, was admitted to the royal ear clinic in Berlin. At the operation, a broken-down cholesteatoma was found, a sequestrum

in the antrum, and the dura exposed; three days later, pronounced and amnesic aphasia, agraphia, alexia, and paraphasia. The patient is right-handed. The operation exposed a small deep-seated abscess in the temporal lobe. The aphasia disappeared. After fourteen days, the same symptoms recurred with the appearance of general cerebral compression and hemiopia. The wound in the brain was dilated and three to four tablespoonfuls of fetid pus were evacuated. The improvement was followed fourteen days later by severe headache, vomiting, general prostration. The occipital lobe was exposed and an empty cavity found. A very large collection of pus was evacuated; the abscess extended in a median direction.

After ten days, another operation was undertaken on the brain. The brain substance was found partly softened, but no pus. After this, two attacks set in, a very severe headache, vomiting, and general collapse, which lasted for twenty-four hours.

Four months after the first operation, the patient was discharged cured.

This is the first case in which in a right-handed patient disturbances of speech were found in an abscess in the right temporal lobe, and shows that in cases of double-sided chronic otorrhœa with aphasic symptoms it is not always proper to operate only on the left side.

Discussion.—KOERNER: The "distant action" is not rare in cases of small abscesses, though it may be absent in large abscesses. It is probably due to slight encephalitis.

PASSOW found this substantiated in two cases.

22. BLOCH recommends **scopolamin narcosis** for lengthy operations. Three subcutaneous injections of one gram each are made of the following solution: scopolamin. hydrochlor., 0.012; morphin. hydrochlor., 0.12; aqu. dest., 10.0; the first injection four hours, the second two, and the last one hour before the operation. If any pain is felt during the operation, the chloroform mask is applied for a short time. There is no reaction on awakening.

Discussion.—WOLF questions the advisability of scopolamin in children.

23. ESCHWEILER: **Transplantation and first dressing after the radical operation.**

Vioform gauze prepared according to Schmieden is recommended for packing. The first dressing remains for fourteen

days, and in five cases the transplanted skin healed. The retroauricular wound is sutured primarily. Transplantation is contraindicated on exposed dura or sinus. This odorless gauze works very well in the after-treatment.

In the discussion, WERNER, SIEBENMANN, and SCHEIBE report favorable results with vioform gauze.

24. HOELSCHER spoke on **pus retention** and extension of the purulent process in **sclerosed mastoid processes**.

25. KREBS: **The preparation for and after-treatment of intranasal operations.**

26. WINKLER: **On the surgery of maxillary empyema.**

REPORT OF THE TRANSACTIONS OF THE NEW YORK OTOLOGICAL SOCIETY.

By T. PASSMORE BERENS, M.D., ACTING SECRETARY.

MEETING OF MAY 26, 1903. THE PRESIDENT, DR. J. B. EMERSON, IN
THE CHAIR. DR. LUC OF PARIS AND DR. BRYANT OF
BOSTON, GUESTS.

Presentation of Patients.

Dr. GRUENING presented a patient on whom he had successfully operated for **brain abscess**. The patient—a boy thirteen years old—presented himself at the Mt. Sinai Hospital on April 15th with a temperature of 102° F. He had been sick for four weeks, and had had a discharge from both ears for six years. The right ear was quiescent, the left was discharging fetid pus and cholesteatomatous masses. The mastoid region was red, œdematous, and tender to pressure. Shortly after admission, he had a severe headache on the left side, a chill, and a temperature of 102° F. A radical mastoid operation was performed. Extensive caries was found, which involved the upper posterior bony wall of the external auditory canal. The malleus and incus were absent, and the antrum, which was much larger than usual, was found filled with cholesteatomatous material. The tegmen of the antrum was carious and the dura mater was covered with granulations. The wound was dressed in the usual manner and the patient did well. Eight days after the operation, the patient vomited and had a severe headache on the affected side. The temperature was normal and the pulse ranged from 48 to 54. The eyes were examined: the papillæ were swollen, presenting the appearance of a neuroretinitis. The next day, April 25th, the symptoms were more pronounced, but there were no localizing symptoms and no sensory aphasia. The wound was reopened, and under antiseptic

tic precautions the dura was exposed over the roof of the antrum, beneath the temporal ridge and part of the squama. No fistula was found in the dura, but there was a marked discoloration over the antrum. The dura was punctured with an aspirating needle through the discolored spot. After the needle had perforated one inch, a syringe of fetid pus was withdrawn. A crucial incision was then made through the dura, which permitted evacuation of about two ounces of pus. The finger was then introduced and a large abscess cavity found. The wound in the brain was enlarged with forceps and packed with strips of gauze. The gauze used was about half an inch broad and had a selva on both edges to prevent ravelling. Immediately following the evacuation of the pus, the pulse rate rose to 100. The day following the operation, the patient developed sensory aphasia, but felt better. The wound was dressed. Pus and a considerable quantity of serum followed the removal of the dressing. On the two succeeding days, pus and serum exuded on the removal of the dressings. Since that time the patient has made an uninterrupted recovery. The mastoid wound is nearly healed, and the patient has no other symptom than the optic neuritis, which still persists.

Dr. LUC asked Dr. Gruening if dry gauze only had been used in the packing of the brain abscess, for he had found that moist gauze was better. Dr. GRUENING answered that he had used only ribbons of gauze as drainage, that they were inserted dry, but that the external dressing had been of moist gauze, so that the ribbons doubtless became moistened.

Dr. PHILLIPS presented a patient suffering with **double facial paralysis** together with other symptoms of a **tumor in the pons Varolii**, probably specific.

Dr. SHEPPARD presented a patient—male, six years old—on whom he had performed a radical **Schwartz-Stacke** operation on the right ear seven weeks before, at the same time doing an ossiculectomy in the left ear and removing adenoids. He presented the patient to demonstrate the value of a **large canal opening**, to obtain which the horizontal incision was extended well outward into the concha, most of the posterior surface of which was thrown upward to form the roof of the operative canal. The patient's wound was almost completely dermatized.

Dr. KIPP asked what the after-treatment had been, and Dr. SHEPPARD answered: "Tight packing with oxide of zinc gauze for ten days and later with plain sterile gauze."

Dr. LUC congratulated Dr. Sheppard on the result, and mentioned the advantages of the radical operation. He spoke of a flap operation performed by Dr. Berens that he thought would materially shorten the after-treatment in these cases.

Dr. BERENS described a **plastic operation** as follows: The first incision is made at the hair-line; the skin and superficial fascia are then dissected from the periosteum to the posterior attachment of the auricle, where the periosteum is divided, and the auricle is pushed forward. After the radical operation on the bone has been performed, a Koerner flap is cut from the posterior membranous canal wall in the usual manner. An inverted comma-shaped flap is then cut from the tissues previously dissected from the soft parts behind the auricle. The *tail* of the comma forms a pedicle from which the skin is removed, leaving a thick mass of subcutaneous tissue. The skin remains on *the head of the comma*, but the superficial fascia is removed from it. Thus a large growth of skin is nourished by a pedicle of superficial fascia. The skin portion of the flap is then used to cover in the middle ear, the attic, and the antrum, and it is stitched to the cut edge of the superior wall of the membranous canal. This skin-graft is then packed firmly into the cavity, and it should be sufficiently large to cover the whole cavity. It is held in place by a very tight gauze packing. The Koerner flap is then placed backward and is used to cover the auricle beneath the concha. The wound posterior to the auricle is then sutured. The dressings are not disturbed for ten days or more. They are renewed once or twice only; and in successful cases the after-treatment extends over a week or ten days after the permanent removal of the dressings.

Dr. KENEFICK asked whether this operation was used where pus was found. Dr. BERENS answered that this procedure was followed in the cases where a radical operation was performed for chronic suppuration, where the wound was clean, and that where the wound was not clean the flap was done as a secondary operation.

Dr. TOEPLITZ presented a patient—male, twenty-three years old—with **secondary hemorrhage** from the tonsil, persisting three weeks after incision for peritonsillar abscess. The bleeding was controlled by packing the abscess sac with gauze.

Dr. QUINLAN stated that he used sutures to control tonsillar hemorrhage. Dr. GRUENING objected to patients' being kept in recumbent position in cases of bleeding from the nose and throat.

Dr. PHILLIPS exhibited a colored woman, age thirty-six, with a specific history, who presented a **double bilateral facial paralysis**, a bilateral partial deafness, with complete loss of bone-conduction, with staggering gait, and other nervous phenomena indicative of a lesion in the pons. She had been improved by anti-specific remedies.

Presentation of Specimens.

Dr. PHILLIPS presented a **temporal bone** with the **dura mater** attached, which he had removed at autopsy from a case of **purulent leptomeningitis**. He first saw the patient May 7th. There was a history of chronic suppuration that had been healed for several years. For the past few days there had been considerable pain and tenderness in the ear, posterior to the mastoid. The patient refused to go to bed until the 9th of May, when there was a slight redness noticed in the attic. The tenderness and pain were worse. Ice-coil was applied. On the 10th of May, in the evening, there was a chill, and the temperature rose to 105° F. It then dropped to normal, and the patient slept all night. On the 11th of May, the mastoid was opened; the entire tegmen tympani et antri was necrosed, as was also the bony covering of the lateral sinus. The latter was uncovered and found bulging and pulsating. It was not opened. The next day the patient was better, but there was a profuse serous exudate that saturated several dressings. The temperature rose to 106° F. The patient became delirious and drowsy. The patient was etherized, and examination of the wound revealed a small perforation through the dura mater just in front of the knee of the lateral sinus. No pus was found through this perforation. The lateral sinus was opened and a clot removed. No pus was found in the sinus. The patient died next morning, without having regained consciousness. The autopsy revealed a general **leptomeningitis**, which was more pronounced at the seat of the perforation in front of the knee, and the dura adherent over the entire cortex.

In the discussion, Drs. GRUENING and DENCH condemned the use of the ice-coil.

Dr. SHEPPARD reported a similar case with a perforation through the dura immediately in front of the knee of the lateral sinus, with an intra- and extradural abscess.

Dr. HARRIS asked how long Dr. Phillips had applied the ice-coil. Dr. PHILLIPS replied: "Eighteen hours only." He rarely

uses the ice-coil, but thought this case was one of simple congestion, not at first suspecting its gravity.

Dr. DENCH reported a case of **acute suppuration of the middle ear** with a discharge immediately following paracentesis, showing diplococci and a large bacillus that was found to be that frequently discovered in hay and decaying vegetable matter. He believes that this bacillus found its way into the ear by the patient's having used mullen-oil for the relief of her pain.

Dr. QUINLAN reported a case of **continuous pain deep in the bone over the mastoid region** in a young woman who had an acute middle-ear suppuration some three months ago. At present the drum-membrane was healed; there was no redness, but some tenderness upon deep pressure, with a slight oedema over the tip. It was evidently a case of **osteosclerosis**, but the question was: Is it wise from these symptoms to open up the mastoid, and can we give assurances of relief by such measures?

Dr. GRUENING thought this might be a case of **osteosclerosis**, and referred to a patient he had seen with Dr. Berens two years ago.

Dr. BERENS thought Dr. Quinlan's case was one of **mastoiditis** with **osteosclerosis**, requiring an operation. He stated that the case referred to by Dr. Gruening was one of **osteosclerosis** in both mastoids of a female about twenty-five years old. She was of a peculiarly neurotic type. Her only symptoms were pain on deep pressure and a constant excruciating pain in the mastoid. There were no other signs whatever of inflammation. There was an uncertain history of suppuration in early childhood. Both mastoids were opened: no pus was found, but the bone was extremely hard and flinty in spots, and many of the pneumatic cells contained osteophytic deposits which in appearance were suggestive of stalagmites and stalactites. Doubtless the pressure caused by these deposits had caused the pain. The patient made an uninterrupted recovery. There has been no return of pain in the two years elapsing since the operation.

Dr. HARRIS, in the discussion, reported a case of **sclerosed mastoid** in a neurotic girl on whom he had operated, relieving her of pain for three months. The pain returned, however, and was much more severe than before, and was cured by medicinal treatment at the hands of a neurologist. The pain again returned after six months and was again treated in a similar manner. She has had no return of pain for more than a year.

Dr. SHEPPARD asked Dr. Quinlan whether his patient had had mastoid symptoms at the time he saw her. The answer was "Yes,"—but that these symptoms had disappeared after treatment.

Dr. DENCH thought the case should be operated on; that it would be much safer, under the circumstances, to operate than to permit the patient to go without operation.

Dr. KENEFICK spoke about the possibility of the case being one due to dental neuralgia. Dr. QUINLAN answered that there were no carious teeth.

Voluntary Contributions.

Dr. BERENS reported a **rare arterial anomaly**, consisting of the presence of a large main-trunk artery accompanying and immediately anterior to the lateral sinus from the jugular bulb upward to the knee of the sinus, where it curved backward for half an inch, at which point it again took an upward course. The diameter of this vessel was that of an ordinary lead-pencil. It pulsated, and compression of the common carotid caused this pulsation to cease entirely. The anomaly was viewed by the president of the Society and several of the surgeons of the Manhattan Eye and Ear Hospital. The condition was discovered while performing a mastoid operation in which there was an unusual destruction of bone. The patient recovered.

SYSTEMATIC REPORT ON THE PROGRESS OF OTOLOGY FOR THE THIRD AND FOURTH QUARTERS OF THE YEAR 1902.

(Continued from page 253.)

NOSE AND NASO-PHARYNX.

a—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

235. Frankenger, O. The upper air-passages in school children. *M. f. O.*, 1902, No. 5.
236. Harmer, L. On the pathology of the so-called bone cysts of the middle turbinate. *Arch. f. Laryngol.*, vol. xiii.
237. Pitous. On dysmenorrhoea of nasal origin. *Thèse de Bordeaux*, 1902.
238. Libow, B. The connection of disease of the female genitals with diseases of the nose. *Russky Wratsch*, 1902, No. 44.
239. Deodati, C. A case of vertigo of nasal origin. *Archivio italiano di otologia*, vol. xiii, Div. 3.
240. Kassel, P. Nervous palpitation of the heart relieved by removal of the spur of the septum. *Arch. f. Laryng.*, vol. xiii.
241. Wills, A. W. On nervous and psychic disturbance in nasal disease. *Wien. med. Presse*, 1902, Nos. 47 and 48.
242. Lannois. Epilepsy of nasal origin. *Ann. des mal. de l'or., du lar.*, 1902, No. 7.
243. Hahn, R. A case of total anosmia following injury to the skull. *Bolletino dell' orecchio, gola e naso*, 1902, No. 9.
244. Buvinger, Chas. L. Extensive destruction of the nasal septum with involvement of the accessory sinuses, from sepsis. *Phila. Med. Journal*, Oct. 11, 1902.
245. Hanszel, F. Involution of a rhino-laryngeal scleroma by erysipelas of the face, and of a sarcoma of the pharynx by infection with streptococci. *M. f. O.*, 1902, No. 7.
246. Aaser, P. On the infectiousness of a discharged scarlet-fever patient. *Tidsskrift for den norske lægeforening*, 1902, No. 15.
247. Kuster, K. On the prevention of snoring. *Deutsche med. Wochenschr.*, 1902, No. 41.

235. 4777 school children were examined, between six and fifteen years of age. Of these, 68.8% suffered from anomalies of

the respiratory passages. Deviation of the septum was present in 13.2%. These were more frequent on the left than on the right side and increased steadily in frequency from the sixth year. Hypertrophy of the lower turbinate was present in 11.3%; atrophic rhinitis was present in 28; of these, 8 were boys and 20 girls. The hypertrophy in the pharyngeal tonsil was thoroughly treated; it was present in 32.9%. The result of the examinations showed that the elevation of the hard palate was not produced by hyperplasia of the pharyngeal tonsil. The disease appears to occur more frequently in the better situated classes. The higher grades of pharyngeal hyperplasia are, again, as frequent in children who do not get along well at school as in good scholars. It is to be remembered that an examination of the hearing showed that the poor scholars showed almost four times as many cases of deafness as those who got along well, so that it is probable that the non-progress in school was very apt to be the result of the hearing disturbances rather than the other disadvantages of the hyperplasia.

PIFFL.

236. The histological examination of three bony cysts of the middle turbinate filled with pus and eleven filled with air. The bony cysts were observed clinically. They are congenital, growing very little. If, however, they are the seat of empyema, they may attain an excessive size. The internal mucous lining carries a shining epithelium and a very few glands. One should speak of "bony cysts" only when the turbinate is really enlarged by cavities.

ZARNIKO.

237. In connection with the papers of Fliess and Schiff, and from the results of four observations, the author is inclined to believe that dysmenorrhoeic disturbances may originate in the nose and can be improved by treating the nose. The author found a vaso-dilatation of the nasal mucosa in his patients and a tenderness at the "genital areas" of the nose. The application of cocaine did not work suggestively, because in one case it failed in an hysterical girl.

ZIMMERMANN.

238. This is a report of a number of cases which confirm the well-known observations of Fliess on the favorable action of cocaine on the so-called genital areas of the nose.

SACHER.

239. The patient, twenty-six years of age, with syphilitic affection of the nose, suffered from violent headaches, vertigo, and vomiting. After the removal of the crusts which interfered with

the respiration, the vertigo ceased, but recurred as soon as the nose again became occluded. Thus, according to the author, the nasal origin of this vertigo is explained. RIMINI.

240. Palpitation produced on touching the septal spur in a patient, twenty-five years of age, and permanently cured after its removal. ZARNIKO.

241. According to the author, the various psycho-pathological conditions are the result of the combined action of the pathologic constitution of the blood and the lymph congestion in the cerebral lymph spaces caused by obstructing nasal affections. In general, the paper does not bring anything new. WANNER.

242. After extracting two polypi, the patient, twenty-nine years of age, suffered from convulsions, which lasted one minute and recurred upon the re-introduction of the snare. A smaller, though less marked, attack appeared some time later, when the other side was operated upon. The patient was probably an epileptic, as similar attacks had been observed before. ZIMMERMANN.

243. A man thirty-one years of age suffered from total anosmia a few days after receiving a severe blow on the head. This was supposed to have been caused by a laceration of the olfactory nerve by a fracture of the base of the skull, which extended from the left side of the lamina cribrosa to the temporal bone. The author emphasizes the importance of an exact examination of the sense of smell with the olfactometer for the local diagnosis of the fracture of the base of the skull. RIMINI.

244. A man, æt. forty-two, had been operated on during an attack of acute rhinitis on a stormy night by means of the cautery on both sides of the nose and also the septum without aseptic precautions. Empyema of both Highmore's antra and of the left ethmoidal sinus with entire destruction of the vomer, perpendicular plate of the ethmoid, and half of the triangular cartilage ensued. M. TOEPLITZ.

245. A woman forty-eight years of age suffered from scleroma of the upper respiratory passages and was taken ill with facial erysipelas. This was followed by circumscribed infiltrations of the septum and the posterior surface of the soft palate, and the subglottic vaults became very much reduced in size. The formation of crusts ceased entirely. After eight days, infiltration of the larynx again took place.

A child four years of age apparently suffered from peritonsillar

abscess. Incisions gave a discolored fluid containing streptococci and staphylococci. The abscess perforated through the lower part of the ear canal; the middle ear intact; after fourteen days, no swelling in the pharynx; after four weeks, signs of peritonsillar abscess recurred. Excision of a tumor-like tonsil showed a round-cell sarcoma. A very rapid recurrence. Dyspnoea. Tracheotomy. Death after three months.

In connection with these two cases the curative action of erysipelas in malignant tumors is critically discussed. Much weight is laid upon the height of the fever. Injections of toxin influence the tumors only if very high fever occurs. BRÜHL.

246. The author believes that infectious material was contained in the secretion on the nasal and pharyngeal mucous membrane. Painting the mucous membrane with hydrogen peroxide is recommended as a diagnostic aid. If purulent secretion is present, violent development of the case results. MÖLLER.

247. KUSTER recommends a bandage which applies the lower to the upper jaw and thereby prevents a dropping of the lower jaw and snoring. The author agrees with the statement that children as well as adults snore only in the presence of nasal occlusion. In children, the snoring ceases after a few days if the adenoid vegetations have been removed. The bandage may even be of service in adults. It is, however, of no advantage unless the nose has been made patent.

δ.—METHODS OF TREATMENT.

248. Delie, I. The application of paraffin in deformities and affections of the nose. *Extrait des Bulletins et Mémoires de la Société française d'otologie*, etc., 1902.

249. Aue, G. Correction of the saddle-shaped nose by subcutaneous injections of paraffin. *Russky Wratsch*, 1902, No. 34.

250. Eckstein. Subcutaneous and submucous hard-paraffin prothesis. *Deutsche medic. Wochenschr.*, No. 32, 1902.

251. White, J. A. A new operation for the deformity known as saddle-back nose. *Virginia Medical Semi-Monthly*, July 25, 1902.

252. Kusmin, P. A new method of restoring the destroyed nasal septum. *Medicinskoje Obosvenje*, 1902, No. 15.

253. Brown, J. P. Rubber splints in the treatment of septal curvature. *Laryngoscope*, Aug., 1902.

254. Heininx, A. On somnoform. *La presse otolaryngologique*, 1902, No. 9.

255. Sswershewski, L. The applications of hot air in the treatment of certain affections of the nose and throat. *Medicinskoje Obosvenje*, 1902, No. 12.

256. **Mygind, H.** A case of sudden collapse combined with stoppage of the respiration and cyanosis, following operative removal of adenoid vegetations; tracheotomy; recovery. *M. f. O.*, 1902, No. 5.

257. **Lowe, L.** Additional communications on the clearing out of the nose from the mouth. *M. f. O.*, 1902, No. 3.

258. **Lowe, L.** Additional communications on the clearing out of the nose from the mouth. *M. f. O.*, 1902, No. 10.

259. **Fein, J.** A new curette to remove adenoid vegetations. *Wiener klinische Rundschau*, 1902, No. 43.

260. **Kafemann, R.** On rhino-pharyngological operative exercises. *München. med. Wochenschr.*, 1902, No. 44.

261. **Eddy, J. W.** A new tongue depressor. *Medical Record*, Sept. 27, 1902.

262. **Mosher, H. P.** A self-retaining tongue depressor. *Boston Med. and Surg. Journ.*, Aug. 7, 1902.

263. **Alter, Francis.** A modification of Gersuny's method of paraffin injections in so-called saddle-noses to prevent disturbance of muscular action of the nose. *Amer. Medicine*, Nov. 22, 1902.

264. **Wilson, Harold.** A cork nasal splint. *Journ. Amer. Med. Assoc.*, Nov. 29, 1902.

265. **Robertson, Chas. M.** New instrument for the removal of the faucial tonsils. *Journ. Amer. Med. Assoc.*, Nov. 1, 1902.

266. **Powell, Arthur.** The hypodermic injection of a solution of quinine in malaria and ear symptoms. *British Med. Journal*, May 3, 1902.

267. **Lederman, M. D.** Clinical report on the use of argyrol (silver vitelline) in diseases of nose, throat, and ear. *Medical Record*, Nov. 28, 1902.

248. The author reports his experience with the Gersuny method of paraffin injections for nasal deformities and nasal diseases. Good results were obtained especially after operations for sinusitis and removal of the lower turbinate. The procedure in ozæna endeavors to overcome the unusual distance of the nasal cavity and to prevent the collection of crusts. A case of this kind is reported. The instrument and operative technique are described.

RIMINI.

249. The author had tried Stein's method in one case: A quantity of paraffin at the melting-point (42° to 43°) was injected in three sittings under the skin of the nose, and while still in a warm condition the desirable form was obtained by manipulation with the fingers; it has not changed. The result of the injections was, as the illustration shows, very satisfactory.

SACHER.

250. **ECKSTEIN** reports on the very satisfactory result which he, with Professor Wolff, obtained by the use of hard paraffin to improve nasal deformities, closed defects of the hard palate, etc. The hard paraffin has many advantages over the vaseline origin-

ally recommended by Gersuny: it does not melt below 57° or 60° , is easily sterilized, and coagulates in from one to two minutes into a bony, hard mass; it retains permanently any shape and is absolutely non-absorbent. As it coagulates instantaneously, the danger of pulmonary embolus is reduced to a minimum. Hard paraffin heated in a water-bath from 65° to 70° is drawn into a heated syringe and then injected at the desired place. In order to prevent a too rapid cooling, a rubber tube may be applied over the canula and the syringe. If in the case of cleft palate which is operated on after the second year and on account of the depth of the naso-pharynx the closure of the soft palate is an imperfect one, then the hard paraffin is injected in the posterior pharyngeal wall in the region of the Passavant ridge. Astonishingly good results are obtained in improving the speech; all forms of saddle-nose were very much benefited.

251. The author refractures the nasal bones when they have been displaced and brings them into place when they have healed. As a second step, he loosens the skin and subcutaneous tissue at the point of depression subcutaneously so that a probe can be passed from one nostril into the other over the triangular cartilage. Then the inferior lateral cartilage is split from without inward and up to its connection with the septal cartilage. This is done on both sides, leaving a flap hanging in each nostril attached to the angles formed by the septal cartilage and the cartilages of the ala. A thread armed with two needles is now passed through the end of the flap. The needles are then passed up through the gap made between the septal cartilage and the overlying soft parts and then through the superior lateral cartilage and the skin to the opposite side; by tying the two ends of the thread together over a roll of tape, the flap is pulled up into the gap between the skin and the cartilage.

HURD.

252. Through the middle of the upper lip two vertical incisions are passed through its entire thickness, which do not, however, extend through the free border. The upper extremes of the vertical sections are connected at the base of the nasal entrance by a horizontal one. The flap thus produced, with its face down, is pushed up and attached by two or three sutures to the tip of the nose: one or two sutures are placed underneath the flap to unite the defect in the upper lip. In applying the dressing the upper lip is pushed upward after eight or ten days, and when the flap is sufficiently healed it is separated. The vertical in-

cisions are then continued up to the free border of the lip, the free border of the flap is renewed and stitched to the middle of the lower margin of the internal nose. The defect of the lip is overcome by suture.

SACHER.

253. For deformities of the cartilaginous portion of the nasal septum BROWN finds rubber splints useful. The splints are cut from rubber sheeting $\frac{1}{8}$, $\frac{3}{8}$, and $\frac{1}{2}$ in. in thickness and the exact size and shape vary in each case. The method of procedure is to incise with a tenotomy knife, which is passed from behind forward in one or two straight incisions through the cartilage, they being a short distance apart and parallel. The incisions are usually made on the bevel so that their edges can glide over one another. A finger is passed into the nostril and the septum pressed toward the median line. A splint is now chosen that after insertion will produce slight pressure on both the inferior turbinates and the septum. There should be room enough above and below the splint to pass a pledget of cotton to clean the nostril. After insertion, the splint should be left in place until healing and solidity have taken place; this may take from two to four weeks. The nose should be cleaned and watched by the surgeon for several days and the case kept under observation until the splint is removed.

HURD.

254. Somnoform consists of 60 % chlorethyl, 35 % chlormethyl, 5 % bromethyl. It is very volatile and is therefore very quickly absorbed and rapidly excreted. It is just like bromethyl, but is less poisonous; sleep is shorter than with this drug; unpleasant accidents are not to be feared; even vomiting after operation is rare; palatal and laryngeal reflexes remain. According to the author, somnoform is a distinct improvement over bromethyl.

BRANDT.

255. The so-called Hollender's apparatus is used. The application of hot, dry air is useful in acute and subacute coryza, in ozæna, in gummata, and in neurosis. It is of less use in hypertrophy of the nasal tissues and in the atrophied processes of the naso-pharynx. In catarrh of the Eustachian tube, and in otitis especially, hot air is contra-indicated—it depends on the site and kind of disease. Hot air of 72° on passing through the nasal passages causes in from three to five minutes a contraction and drying up of the mucous membrane; at a temperature of 90° the mucous membrane dries out very completely, and at 130° a formation of crusts can be observed.

SACHER.

256. A child, two years of age, with pronounced rachitis, suffered from diarrhoea and obstinate bronchial catarrh. The pharyngeal tonsil completely interfered with respiration and was removed with Beckmann's curette. At the same moment, collapse, cessation of respiration, and cyanosis set in. The extirpated tonsil could not be found nor detected by examination of the larynx. Respiration only resumed after tracheotomy had been performed. The author explains the collapse by the fact that the action on the central nervous system similar to shock takes place in rachitic children. The stoppage of respiration was due to spasm of the glottis. Based on this observation and others contained in literature, the author says that in the removal of the pharyngeal tonsils in rachitic children we must always be prepared to perform tracheotomy. PIFFL.

257. The operative procedure of this author has been previously described. After telling of the after-treatment and the results obtained by other methods of cleansing the nose, the description of the operated cases follows. There were ten cases. Five of these were operated by others on account of the removal of nasal and naso-pharyngeal tumors. The five operated on by this author are as follows:

- (1) A badly necrosed carcinoma which caused death.
- (2) Nasal polypi with empyema of all the accessory sinuses.
- (3) Nasal polypi, with death nine days after operation from erysipelas.
- (4) A case of sarcoma (?) which recurred two weeks later.
- (5) Polypoid mucous-membrane degeneration with empyema in both antrums of Highmore. In this case, which was operated on twice, acute otitis on the left side set in after two weeks.

PIFFL.

258. A description of the technical peculiarities and report of five additional operations. Evisceration of the nose from the mouth and autopsy in the living—as the author chooses to call it—was undertaken in the first case on account of the general polypoid degeneration with multiple empyema. After operation, pyæmia was suspected; spontaneous loss of teeth after a few months; collapse of the polypi after one half-year.

- (2) Ozæna, multiple empyema. Six months after operation, ozæna secretion without odor.

- (3) Caries in the posterior part of the right nose.

- (4 and 5) Nasal polypi.

The victims of this operative procedure are truly to be pitied,

especially as the symptoms of these patients could have been treated by the ordinary intranasal operations. BRÜHL.

259. As the handle of the curette is restrained in moving in its area by the maxilla, FEIN has displaced the lever arm externally to the teeth and has turned the shaft vertically on one side to the point of retention. The shaft is bayonet-shaped and is then bent sidewise. Three sizes are necessary on account of the varying height of the nasal pharynx. (The small bend in the sagittal plane has already been recommended by Bezold.) If the necessary force is used, the modification does not seem to be without value. WANNER.

261. The tongue depressor is constructed like a uterine dilator with the blades spread, and it is only used in extracting foreign bodies. M. TOEPLITZ.

262. MOSHER's tongue depressor consists merely of a spring, one end of which catches the tongue from above and the other under the chin, steadying it well in the middle. It is applied and taken off by pressing on the two sides. The chin-piece is pivoted so that it can swing in a horizontal axis and catch on the side of the chin, in order to hold the tongue in place on the side. The length of the blade is made changeable. M. TOEPLITZ.

263. In order to overcome the paralysis of the muscular action of the wings of the nose after paraffin injections, resulting in impeded nasal respiration, ALTER corrected the condition by excising the inner-posterior portions of the alæ of the nose. It can be prevented by firmly compressing the wings of the nose during the operation by an assistant, placing a thumb in each nostril, and making counter-pressure on the outside with the index finger until the nose has been moulded into its proper shape. M. TOEPLITZ.

264. A hole is bored through a piece of cork with a perforator and the splint is shaped with a sharp knife according to the individual case and smoothened with file and sandpaper. It is then dropped into hot, melted paraffin. M. TOEPLITZ.

265. The pillars of the palate are separated from the tonsil with a blunt-pointed, double-edged bistoury curved on the flat. The tonsil is then grasped with a fixation forceps and removed with scissors, which are made in two sizes, rights and lefts, bent on the long axis with a double joint, and are curved. M. TOEPLITZ.

266. POWELL states that quinine given hypodermically does not cause deafness and tinnitus in persons who suffer from these effects after the administration of even small doses given by the mouth.

The salt he most uses is the hydro-chlorosulphate, one part of which is dissolved in three or four parts of a 1:5000 solution of perchloride of mercury, the solution being boiled at least twice. He has used as much as 36 grains in one injection, and has always given at least 15 grains, while 18 grains have been given to a child of nine with none but good effects.

He would not give these large doses in the presence of hallux lobinuria, or to a person who had formerly had black-water fever. He prefers to inject the solution deeply into the flank or buttock, all antiseptic precautions being taken. ARTHUR CHEATLE.

267. A 50-per-cent. solution of argyrol was used in cases of chronic suppuration of the middle ear where there was a large perforation, no excessive granulations, and but little necrosis, and it was observed that the mucous membrane became paler and less boggy in appearance, and the discharge assumed more of a mucoid character. A saturated solution was used in attic suppuration without causing any discomfort. The writer thinks that argyrol possesses the good qualities of the silver nitrate without its unpleasant irritating features. CLEMENS.

C.—DISEASES OF THE ACCESSORY CAVITIES.

268. Dempel, M. On the diagnosis of inflammations of the maxillary antrum with Stein's needle. *Medicinskoje Obosvenje*, 1902, No. 8.

269. Mosher, H. P. The anatomy of the operation of reaching the ethmoidal cells through the antrum. *Amer. Jour. Med. Sciences*, Oct., 1902.

270. Selensky, G. On the complications of influenza. Disease of the antrum of Highmore in influenza. *Praktitschesky Wratsch*, 1902, No. 26.

271. Sturmann, Dr. On the treatment of empyema of the maxillary antrum. *Berl. klin. Wochenschr.*, 1902, No. 29.

272. Strazza, G. Abnormal case of chronic maxillary sinusitis. *Annali di laringologia ed otologia*, III Jahrg., No. 2.

273. Reitter, C. Empyema of the antrum of Highmore and acute peritonitis. *M. f. O.*, 1902, No. 2.

274. Löwy, R. Empyema of the maxillary antrum in diabetes. *Deutsch. med. Wochenschr.*, No. 27, 1902.

275. Gerber, Dr. My method of operation in chronic empyema of the maxillary antrum. *Deutsch. med. Wochenschr.*, No. 27, 1902.

276. Struppler, T. On rhinogenous purulent meningitis and cerebro-spinal meningitis. *München. med. Wochenschr.*, 1902, No. 45.

277. Gibb, Jos. S. Sarcoma of the nerves and ethmoidal cells. *Amer. Medicine*, Nov. 1, 1902.

278. **Krauss, L., and Killian, G.** Killian's radical operation for chronic suppuration of the frontal sinus. (1) Historical development of the method based on a description of cases. (2) Additional cases and conclusions. *Arch. f. Laryngol.*, vol. xiii.

279. **Grois, Ch.** On the radical and rapid cure of chronic frontal sinusitis. *Presse oto-laryngologique Belge*, No. 10, 1902.

280. **Curtis, H. H.** The technique of frontal-sinus operations, with report of three cases treated without nasal drainage. *Laryngoscope*, July, 1902.

281. **Coffin, L. A.** On the diagnosis and treatment of diseases of the frontal sinus. *Laryngoscope*, July, 1902.

282. **Guissez.** The surgical treatment of purulent ethmoiditis. *Ann. des mal. de l'or., du lar.*, etc., 1902, No. 8.

283. **Lindt.** Several cases of maxillary incisions. *Correspondenzbl. f. Schweizer. Aerzte*, 1902, Nos. 13 and 14.

284. **Bourlon.** Suppurating cysts of dental origin. Healing after removal of sequestrum. *Ann. des mal. de l'or., du lar.*, etc., 1902, No. 10.

285. **Solenberger, A. R.** Polypi in the nasal accessory cavities. *Phila. Med. Jour.*, Dec. 20, 1902.

286. **Hoople, H. N.** Pathology of the antrum of Highmore. *Med. News*, Aug. 16, 1902.

287. **Toeplitz, M.** Empyema of the frontal and ethmoidal sinuses, complicated by eye disease. *N. Y. Med. Jour.*, Sept. 6, 1902.

288. **Bryan, J. H.** Chronic empyema of the frontal, ethmoidal, and both sphenoidal sinuses, with extensive necrosis, complicated with adenoma of the posterior ethmoidal and sphenoidal regions. *Amer. Jour. Med. Sciences*, Sept., 1902.

268. The author has had very good success with the use of this needle in twenty cases. After cocainizing the mucous membrane, the needle is inserted under the lower turbinal at about the middle. The wall is perforated while the needle is given an arc-like motion. The bone near the insertion of the turbinal is thinner, consequently perforation is easier at this point. In cases where perforation is not possible on account of thickness of the bone, puncture may be practised from the middle meatus.

SACHER.

269. The ethmoidal cells, particularly the middle and posterior, as well as the sphenoidal sinus, can be easily reached through Highmore's antrum. The inner wall of the antrum contains in its first half-inch the outer boundary of the lachrymal canal; then comes the ostium; the next half-inch is made up of membrane, and finally for three-fourths of an inch it is bony. A curette entered through the ostium, inclined toward the septum, and carried back in this incision would strike first the ethmoidal bulla with the rest of the middle ethmoidal cells, then the posterior cells, and finally the anterior wall of the sphenoid. The paper is well illustrated by a diagram and bone sections. M. TOEPLITZ.

270. In the last four years this author has observed twelve cases of inflammation of the antrum of Highmore following influenza. As a prophylactic, and to cure the coryza, the author recommends insufflation of powder—muriate of cocaine, menthol, $\bar{a}\bar{a}$ 0.12; boric acid, antipyrin, $\bar{a}\bar{a}$ 0.8. This powder is insufflated in the nose three or four times a day.

SACHER.

271. Three different processes are collected under the name of suppuration of the antrum of Highmore: (1) catarrh, (2) hyperplastic processes and new formations, (3) destructive processes. The great majority of the suppurations belong in the first group. As the simple catarrh of the mucous membrane is not a proper indication for radical operation with removal of the diseased parts and the substitution of this tissue by scars, in the majority of cases of empyema of the maxillary antrum the conservative plan of treatment is indicated, viz., irrigation through the alveolus. As our diagnostic means do not always enable us to differentiate simple catarrh from the more severe processes, it is necessary that we should in each case begin with the conservative treatment. The cases then very soon divide into those which after a few days show a quantitative and qualitative favorable change in the secretion, and to those in which no distinct progress is obtained by irrigation. If the irrigations have been practised without success from four to six weeks, recovery by the topical means is not to be expected, and the radical procedure, consisting in the broad opening through the canine fossa, is indicated. In these cases (which do not make up one-third of all of them) the changes in the mucous membrane are not those of ordinary catarrh, but extensive neoplastic and destructive processes. The latter, however, are very rare and are generally due to syphilis, tuberculosis, or traumatism.

MÜLLER.

272. In this case the upper half of the left antrum of Highmore was fully developed and extended above the floor of the orbit, presenting a convex surface. The broad opening of this cavity, by the opening of its entire wall, is warmly recommended by the author. He has had very little success with all the other methods.

Rimini.

273. An additional case of simultaneous disease of the antrum of Highmore and acute peritonitis after removal of polypi; angina with high fever set in, followed by peritonitis. At autopsy, streptococci were found in the pus of the antrum as well as in the peritoneum.

PiffL.

274. The patient, a man fifty years of age, whose urine contained 7 % sugar, with suppuration of the antrum of Highmore. During a period free from sugar the cavity was aspirated and irrigated. Recovery. BRÜHL.

275. The method consists of the broad opening of the antrum of Highmore from the canine fossa. The cavity is thoroughly curetted and then the nasal wall in the middle meatus is resected and the mucous membrane in the canine fossa is united by sutures. The author has had good results from this method, and has abandoned the nasal method, which he thinks has to-day been almost given up. He does not favor the making of a counter-opening in the lower meatus, because it is impossible to do so without resecting the lower turbinal. The reviewer does not consider GERBER's criticisms in either respect as correct, as the pure nasal method in a great many cases is sufficient, even in the chronic cases; and, secondly, the resection of the nasal wall in the lower meatus is not very difficult even if a part of the lower turbinal is resected. NOLTENIUS.

276. Report of a case of cerebro-spinal meningitis and two cases of meningitis. At autopsy, simultaneous suppuration in the antrum of Highmore, and in one case also in the ethmoid and frontal sinuses, was present. There was no change in the bones of the skull.

277. A female, aged thirty-eight, was observed for six years with nasal polypi blocking both nostrils. Each attempt at removal was accompanied by violent hemorrhage. The first recurrence took place after eight months, the second in a few weeks, and the following occurred always after removal with copious bleeding. After four years a solid mass of tissue was seen in the region of the middle turbinate surrounded by a mass of polypi, which, when attacked by cutting, bled alarmingly. Spontaneous epistaxis then began to occur, causing extreme anæmia and weakness. The growth was located within the ethmoidal cells; it increased; the nasal bones separated. Both orbital cavities were encroached upon, the right more than the left; the inner bony wall of the orbit became attenuated, and the growth finally burst through into the right orbital cavity, displacing the eyeball and giving the face a repulsive expression. No operation was permitted; autopsy refused. GIBB advocated the ligation of the external carotid followed by thorough curetting of the mass within the ethmoidal cells. TOEPLITZ.

278. KILLIAN'S radical operation for chronic frontal sinusitis attempts a complete evisceration of the diseased frontal sinus: by resecting (1) the anterior wall and then (2) the orbital wall. To prevent disfigurement the orbital margin remains. (3) Finally, the operation seeks to remove any disease in the frontal ethmoid cells after resection of the frontal processes of the superior maxilla. The operation gives a free exposure of the entire frontal sinus, with all its corners and depressions, and, consequently, the best chances for a cure. When properly performed, the trochlea can be preserved in its position, and diplopia does not follow. The cosmetic results are satisfactory in cases which have been well operated upon. The technique of the operation is described with very instructive diagrams. KRAUSS gives the development of the method. Fourteen case histories are described, with remarks, and with especial regard to the mistakes which have been made.

ZARNIKO.

279. GROIS trephines with the electric burr (Doyen) the frontal sinus and removes the entire anterior wall with the bone forceps, and the entire superior wall of the orbit to the internal angle with the gouge. The orbital-periosteum is carefully preserved; the infundibulum is curetted or enlarged with the gouge, and the anterior ethmoidal cells—which are always diseased—are thoroughly treated. The entire wound is cauterized with a 5 % chloride-of-zinc solution. A broad drainage tube is passed through the infundibulum into the nose. Suture and packing. Recovery after five or six days by agglutination of the soft parts to the posterior wall of the front sinus.

BRANDT.

280. CURTIS modifies the regular open operation by draining from the upper instead of the most dependent part of wound, and he puts two or three stitches in each end of wound, leaving an opening about one inch long in order to gain access to fronto-nasal duct and be able to pack and examine all portions of the sinus. He keeps the fronto-nasal duct well packed and also keeps the flaps well elevated with iodoform wool, and as the sinus granulates he takes more stitches, closing wound down to a quarter of an inch which he keeps open for final packings.

HURD.

281. The author advocates exploratory incision by an osteoplastic flap on all doubtful cases. The exploratory opening should be as low as possible on the anterior wall and just over the inner canthus of eye. When the sinus is found diseased he

prefers the open to the closed method and says no more work should be done between sinus and nasal cavity than necessary. He uses a trephine, by means of which any part of a circle can be cut. HURD.

282. After an extensive description of the topography of the ethmoid cells to the neighboring cavities, the treatment of the isolated disease of the ethmoid cells is discussed, the method from the orbit and from the nose is compared, then the treatment of associated empyema of the frontal sinus and maxillary antrum, and finally, the Bardenheuer decortication, as modified by Goris. Seven case histories are reported. ZIMMERMANN.

283. Five cases of maxillary cysts which have been operated upon are described, which appeared under the picture of fetid nasal suppurations from carious roots of teeth. The differential diagnosis between cysts and empyema of the antrum is furnished principally by the distension of the bone in the antrum, tooth roots, and by the chronic fistulæ in the canine fossa. The antrum appears to be normal after exploratory puncture.

It is also important to remember that fluid injected into the cysts, unless they should communicate with the antrum, does not escape from the middle meatus. In doubtful cases, microscopic examination of the contents of the cavities and the lining membrane may be made. The radical treatment consists, in all cases where suppuration of the membrane and formation of granulations have existed for some time, in removing the entire anterior wall of the cyst and curetting the inflamed tissue. A surface free from epithelium must be left, which communicates with the mouth or the nose. RAU.

284. There was a distension of the anterior wall of the superior maxillary as large as a nut; a fistula behind the second molar tooth entered into this cavity and fetid pus was discharged. No communication with the nose. The second molar tooth was extracted, and a few days later a rather large sequestrum was cast off. Recovery with a certain amount of thickening.

ZIMMERMANN.

285. Recurrence of nasal polypi is chiefly due to caries of the bone; however, not all nasal polypi originate on or in bone. They may originate in the mucous membrane alone, or in the lower layer of the periosteum, or in the lining membrane of the cavities. M. TOEPLITZ.

286. The air cavities of the face resemble a set of flasks with

one narrow mouth over which the wind plays. The principle in physics suggesting this arrangement is represented by the Sprengle air-pump, which frees the flask from air by pouring mercury down a capillary funnel tube laterally connected in the flask; the moisture is thereby abstracted from the cavities. The existence of empyema destroys this function. The feeling of fulness in coryza, influenza, sinusitis is due to a water-logged condition of the air cavities. Empyema of the antrum of Highmore gives no certain symptoms of its existence, unless a disturbance of the economy of the nervous system leads to its recognition; examples are cited. The poverty of the blood-supply to the thin lining explains the paucity of granulations; still, three cases of severe hemorrhage have occurred, one, of HOOPLE's own observation, being extensively quoted. Other features of the pathology, as bacteriology, polypi, hypertrophy, hydrops, malignancy, etiology, traumatism, latency, etc. are mostly proven by references. M. TOEPLITZ.

287. A man, æt. forty-eight, suffered from a chronic hypertrophic nasal catarrh, which was aggravated by deviation of the septum to the right and superiorly above, and which, together with the hypertrophy of the middle turbinal led to closure of the mouth of the frontal sinus in the infundibulum. After the ethmoidal and frontal sinuses were infected by influenza, it took four years until the final exacerbation brought the condition to a final issue. Excruciating headaches over the right forehead, a hidden odor in the head, purulent discharge along the outer wall of the right nostril, a doughy swelling in the inner angle of the right eye, and sensitiveness on pressure upon the floor of the sinus established the diagnosis of empyema of the frontal sinus. After removal of the right middle turbinal and curetting of the sinus through the nose, two red streaks, each running from the inner angle of the right eye over half of the upper and lower lid, appeared two hours later. On the following day, considerable swelling of both lids, chemosis of the conjunctivæ with mucous discharge and closure of the eye were manifest. Slight exophthalmus and restriction of the movements of the globe rendered the diagnosis of an orbital phlegmon probable. Through an opening from without, much pus, polypi, and carious bone were removed, but there was not any pus behind the globe. Five days later an abscess of the lower lid opened spontaneously, and the patient made, from now on, an uninterrupted recovery. M. TOEPLITZ.

288. A woman, aged forty-eight years, complained, in January,

1899, of excruciating headaches over the left side of the head, which began eight years before during convalescence from pneumonia, and she had ever since had dropping of mucus into the nasal space, which increased during the last two years and recently became fetid, producing nausea. The headaches intensified when the discharges diminished. Pain upon pressure was felt over the supraorbital ridge and under it near the inner angle. Thick yellow secretion was observed in the postnasal space over the posterior extremity of the left turbinal. The probe revealed extensive caries of the anterior ethmoid region. The anterior ethmoid cells were frequently curetted. After four and one-half months, through an outer operation all diseased bone as far it could be felt was removed. After four weeks, an abscess of the upper lid was evacuated, leaving a fistula below the ridge and an opening above it, which necessitated in January, 1900, another extensive exposure of the frontal and ethmoid sinuses, and a penetration of an over-extended ethmoid cell five weeks later. The headaches returned in May, increased, and pain arose in the left eye. A swelling along the internal portion of the floor of the orbit, extending upward to the inner angle and backward, was penetrated about the region of the os planum, and pus and soft tissue were removed. The frontal sinus was now found to be firmly filled out. The eye symptoms ceased. There still came muco-purulent secretion from the middle ethmoid region. In September there was pain in the occipital region and the vertex, swelling over the left eye near the inner angle, and a small sinus leading into ethmoid, which was curetted. October 5, 1900: A large bony growth, triangular, with base attached to the middle meatus, extending across the vestibule of the nose, behind which, when removed, a firm growth, grayish in color, was discovered springing from the ethmoid bone between the middle and superior turbinals and in the region of the posterior ethmoidal cells; it was quite firm, not readily bleeding, blocked the upper portion of the nose, and pressed firmly against the posterior portion of the vomer, destroying part of the septum and causing necrosis of the bone. After partial removal it was found to extend backward and to be attached to the anterior wall of the left sphenoidal sinus. The sphenoid cavity was opened by a double-edged knife, and much pus was removed from the cavity, affording the greatest relief. The whole sphenoid bone, its septum, and roof were extensively necrotic. The tumor had to be repeatedly removed. The pus

contained predominantly the staphylococcus. The growth was an adenoma, possibly a malignant one. May 5, 1902: The entire growth has been successfully removed and after an interval of one year there was no evidence of return. The suppuration in the sphenoid ceased; there remained only one small cell in the posterior ethmoidal region where pus is formed. The general condition is very much improved. M. TOEPLITZ.

d.—TUMORS OF THE NOSE.

289. Citelli and Calamida. On epithelioma of the nasal mucous membrane. *Arch. f. Laryngol.*, vol. xiii.

290. Comisso, E. On osteoplastic carcinoma. *Wiener klin. Wochenschr.*, 1902, No. 50.

291. Allen, Seabury W. A probable myxo-fibroma of the nose. *Boston Med. and Surg. Jour.*, Nov., 1902.

292. Mayer, Emil. Adenoma of the nose with incipient sarcomatous metamorphosis. *American Medicine*, Aug. 2, 1902.

293. Powell, F. Specimen of fibroma removed from the left maxillary antrum of a male aged eighteen years. *Laryngol. Society of London*, April 11, 1902.

289. After a short description of a carcinoma of the nasal cavities, the case-histories and microscopic examinations of eight cases which were observed in Gradenigo's clinic are given. They were papillo-adenomata with beginning carcinomatous, five papillary varieties, of which the first scarcely showed any transition of carcinoma; this transition in the second and third was complete; in the fourth and fifth, the landmarks of a primary papilloma were still present, although the tumor was to be classed as a carcinoma. The carcinoma consists of squamous epithelium with partial keratosis. The first two tumors evidently originated in the nasal mucosa; the others, from the superficial epithelium.

ZARNIKO.

290. This was a cylinder-cell carcinoma of the nasal accessory cavities, which had invaded the large part of the base of the skull with the formation of very large bony tumors. The patient had suffered for two years from papilloma of the left nasal cavity, which had been repeatedly curetted. Then a small, hard nipple appeared on the left side of the nose below the inner angle of the eye. The histological diagnosis of osteo-blastomatosis adenoma was made.

WANNER.

291. Five photographs show the man, æt. thirty-four, four feet high, who had noticed twenty-two years ago a slight protrusion of

the left lower eyelid, and some months later a soft, friable, easily bleeding tumor at the left nostril, slowly progressing since that time and lately emerging from the mouth, breaking through the hard palate and separating the upper teeth. The centre of the mass has sloughed away, leaving a cavity of the size of a fist. The left eye has lost its sight, but not its sensitiveness; neither eye can be completely closed owing to ectropium. No operation could be performed on account of the difficulty of etherizing and the danger of a fatal hemorrhage. No microscopical examination was made. Seven X-ray exposures seem to have diminished the odor, discharge, and the size of the mass. M. TOEPLITZ.

292. A man, sixty-eight years old, was kicked over twenty years ago by a horse, whereby his nose was depressed over the bone and the cavity obstructed. For six years numerous polypi have been snared off. During the past year the character of the growth changed. A large tumor presented on the left side; it was soft, bled easily, extended into the posterior nares, and depressed the hard palate. After preliminary tracheotomy the immense growth was evulsed from without. It had originated from the left turbinated bone. There was an entire absence of the vomer, nasal bones on the left, and most of the superior maxilla that formed the hard palate; the septal cartilage was intact. Microscopically it proved to be a papillo-adenoma with a remote possibility of sarcomatous complications; clinically there was an incipient sarcomatous metamorphosis. M. TOEPLITZ.

293. The mass projected into the postnasal space, having an attachment to the under surface of the floor of the orbit. The fibroma was the size of a small kidney. How was it removed?

ARTHUR CHEATLE.

c.—OTHER DISEASES OF THE NOSE.

294. Bruck, F. On the treatment of transition erythema of the nose. *Allgem. med. Centr. Zeitung*, 1902, No. 53.

295. Grünwald, L. On the present position of the ozæna question. *Arch. f. Laryngol.*, vol. xiii.

296. Grosskopf, W. Ozæna. *Haug's Klin. Vortr.*, vol. v.

297. Rode, F. On a number of cases of traumatic abscess of the nasal septum. *Wiener klin. Wochenschr.*, 1902, No. 41.

298. Bamberger, J. Perforations in the septum in workers in chromic acid. *Münchener. med. Wochenschr.*, 1902, No. 51.

299. Hellat, P. The treatment of malignant syphilis of the upper respiratory passages. *Mittheilung in der St. Petersburger syphilidologischen Gesellschaft*.

300. Wolff, L. On congenital bony occlusion of the choanæ. *Arch. f. Laryngol.*, vol. xiii.

301. Myles, R. C. Traumatic abscess and necrosis of the nasal triangular cartilage. *N. Y. Med. Journ.*, Aug. 9, 1902.

302. Cheatle, Arthur. Case of congenital absence of the front of the nose, with occlusion of the anterior nares. *Laryngological Society of London*, April 11, 1902.

303. Bishop, L. S. Rhinolith. *The Laryngoscope*, Jan., 1902.

304. Richardson, C. W. Perforation of the septum narium, from a study of twenty-five cases, with regard to etiology and pathologic significance. *Annals of Otology*, Feb., 1902.

305. Hope, G. B. Hay-fever and its radical treatment. *The Laryngoscope*, Aug., 1902.

306. Toeplitz, M. Nasal disturbances in typhoid fever, and their sequelæ. *Medical Record*, Sept. 20, 1902.

294. Gauze compresses soaked in benzine are placed upon the reddened areas of the skin. The redness and the gloss of the skin disappear, owing to the rapid evaporation of the benzine.

ZIMMERMANN.

295. The following conclusions are given: A number of focal suppurations (accessory sinuses, nasal meatus, and adenoid tissue in the epi- and meso-pharynx) running across under the clinical picture of putrid crusts in broad noses. The secretion is at first always fluid, usually without odor, occasionally in a fresh condition, fetid dryness following mechanical influences, of which one of the most important is the adhesiveness on account of the infection with the bacillus mucosa Abel. Other influences are furnished by the unusual breadth of the nose. Atrophy only primarily results from the pressure and the infectious influence of the enormous quantity of crusts. The odor depends upon the saprophytic destruction of the masses of secretion which are retained in a half moist condition on account of their unusual adhesiveness. Whether the more serous constituent of the secretion favors adhesion and decomposition or not, cannot be determined. It is quite certain that general bodily weakness depending upon hereditary basis, and especially upon tuberculosis, favors the primary focal suppurations, as well as the secondary infectious processes, while the disease may lead to a general cachexia.

ZARNIKO.

296. The author has endeavored, after consulting the literature, to give a complete picture of the present knowledge of ozæna. Over three hundred and fifty articles were carefully gone over and the therapeutic recommendations are all carefully stated.

ZIMMERMANN.

297. After a review of the literature of septal abscesses, the author discusses the etiology. Traumatism of a mild degree is sufficient to produce this abscess, and in fact any blow which acts upon the fixed part of any cartilaginous septum. A deviation of the cartilage takes place with the formation of a hematoma, the elevation of the muscular perichondrium lining, and the secondary abscess is formed.

Five case-histories of Chiari's clinic are added. Nasal occlusion set in between the third and seventh day. The tumor was situated usually in the lower and anterior part of the septum. In only one case was the tumor situated at the tubercular septum. In all cases a perforation of the cartilage was present, varying in size between the thickness of the probe and that of a lead-pencil. In no case did a perforation of the septum persist. The defect was always covered by mucous membrane. WANNER.

298. The perforation always occurs at the same place in the septum, because the inspiratory current and with it the chromium dust always acts upon this site. This same explanation has already been given by Poincare. SCHEIBE.

299. HELLAT found that the nose, the naso-pharynx, pharynx, and the larynx were equally attacked by tertiary syphilis. In one case, the tissue of all these organs was covered with small, round, deep ulcers. Treatment with mercury, iodides, and baths was without effect. Improvement and occasional cicatrization were obtained by extensive curettage. SACHER.

300. One-sided bony occlusion; on the other side, indication of a diaphragm. The author agrees with Siebenmann's theory that the height of the palate is a function of leptoprosopia. ZARNIKO.

301. MYLES has seen three cases of traumatic abscess and necrosis of the nasal triangular cartilage caused by sawing off part of the septum by himself. After a few days the cartilage became necrotic, turned white, and gradually softened; fragments came away with the curette. The cavities were packed and filled up without occurrence of perforations or deformity. In other four cases of suppurative perichondritis of the septum caused by blows on the nose, the same treatment was used with the same success. These cases should be separated from all the other forms of perichondritis in which the process does not extend to the anterior-upper border of the triangular cartilage. M. TOEPLITZ.

302. The infant was six weeks old. It was the mother's first child, and was born at full time. There was no history of syphilis. The nasal bones were present, but the framework in front of them was absent. The palate was normal, and no other deformities were present.

ARTHUR CHEATLE.

303. BISHOP removed a rhinolith, weighing 71 grains, from the right nasal fossa of a woman, fifty-nine years old, with the forceps, after it had been crushed into twenty-three fragments.

M. TOEPLITZ.

304. RICHARDSON divides perforations of the septum from a pathologic and etiologic point of view into those arising from organic diseases, such as trauma, syphilis, lupus, tuberculosis, etc., and those without a definite pathology and etiology, the so-called idiopathic perforating ulcer of the septum. An analysis of 25 cases shows 8 due to syphilis, 11 to tuberculosis; of the remaining 6, 2 were due to atrophic rhinitis, 2 to typhoid fever, and 2 presented negative etiological evidence. The preponderance of tuberculosis in these cases is a mere coincidence, and the perforation is caused by impaired nutrition in the mucous membrane.

M. TOEPLITZ.

305. HOPE rejects the pollen theory and refers the nervous element in the production of hay-fever to the turbinated bodies, which are normally sensitive to vasomotor excitement. While the inferior turbinated has received the major share in the past as offending body, to the middle turbinated, constituting a part of the ethmoid and standing in immediate relation to the floor of the brain, a wide range of symptoms of hay-fever are easily attributed. Within Hope's experience, there is no exception where the presence of hay-fever has not been associated with hypertrophy of the middle turbinated, and the removal of which has seemed to demonstrate clinically a most decided arrest in the chain of vasomotor excitement.

M. TOEPLITZ.

306. The nasal disturbances in typhoid fever consist in dryness of the mucous membranes, abrasion of epithelium, erosion, particularly at the anterior portion of the septum, with occasional, frequently intense, and dangerous bleedings. The erosion develops at times into an ulceration and leads finally also to perforation of the septum. On the other hand, it leads to adhesions with the opposite surface of the lower turbinated body, of which two cases are fully given. The nasal accessory cavities are also affected in typhoid fever, as mostly proven by autopsies.

M. TOEPLITZ.

NASO-PHARYNX.

307. **Bjorn, Floridus.** On the importance of hyperplastic and tubercular processes in the pharyngeal tonsil. *Hygeia*, No. 3, p. 269; No. 4, p. 389; No. 5, p. 593, 1902.

308. **Goerke, M.** Cystic formations in the hyperplastic pharyngeal tonsil. *Arch. f. Laryngol.*, vol. xiii.

309. **Fein, W.** The operation for adenoid vegetations in the naso-pharynx. *Arch. f. Laryngol.*, vol. xiii.

310. **Beckmann.** Acute inflammation of the pharyngeal tonsil. *Berl. klin. Wochenschr.*, 1902, No. 50.

311. **Chauveau.** Contribution to the history of nasal pharyngeal polypi up to Levret. *Archives internat. de laryngol., d'otologie et de rhinologie*, Sept.-Oct., 1902.

312. **Kafemann.** A foreign body in the naso-pharynx. *Arch. Laryngol.*, vol. xiii.

313. **Glas, E.** On the pathology of naso-pharyngeal tumors. *Wiener med. Wochenschrift*, 1902, Nos. 46 and 47.

314. **Mackuen, G. Hudson.** A naso-pharyngeal tumor. *Amer. Medicine*, Nov. 22, 1902.

307. The author has examined 905 school-children between the ages of seven and eight years. Digital exploration was practised in 510; in the other cases there were no symptoms pointing to a pharyngeal hypertrophy. In 170 the pharyngeal tonsil was unusually hyperplastic; in 170 it was less pronounced, though distinctly hyperplastic. In other words, 37 % of the children suffered from adenoids. The hearing was reduced in the first group of children 67 %, in the second group 66 %, and in those in which no distinct hyperplasia was present, 31 %. It is remarkable that cerumen exists more frequently in children with pharyngeal hypertrophy than in those where this is absent. In children with signs of an old or still existing otitis, pharyngeal hypertrophy was present in 55 %. He is inclined to remove the pharyngeal tonsil during the course of otitis. He has never seen unpleasant results from this practice—in fact, a rapid improvement. In one case of a child suffering from acute otitis and mild mastoiditis, the mastoiditis disappeared after the removal of the pharyngeal tonsil. In all cases of chronic and relapsing otitis, the pharyngeal tonsil should be removed, unless the condition of the patient contra-indicates a bloody operation. In all cases where mastoid operation had to be undertaken, pharyngeal hypertrophy was found present, and usually to a marked degree. The various symptoms in other organs, produced by pharyngeal

hypertrophy, are then discussed and the clinical picture of scrofulosis is dilated upon. In 829 cases of lymphoma of the neck, the pharyngeal tonsil was enlarged in 48 % of the cases. The author is inclined to regard the scrofulous glands of the neck to be secondary, infection originating in the pharyngeal tonsil. It frequently occurs that after removal the glands in the neck disappear.

The tuberculous processes in the pharyngeal tonsil appear in three varieties: the unusual tuberculomata, the relatively frequent tuberculous ulcerations, and the infiltrating, latent tubercular processes. The last are usually secondary, though they may be primary, and may serve to develop the tuberculosis in other organs, especially under the picture of tubercular lymphoma of the neck, which frequently disappear after removal of the pharyngeal tonsil. Its removal is therefore always indicated.

MÖLLER.

308. The author's conclusions of these very careful investigations, carried on in Brieger's Institute, are summed up as follows : (1) The formation of cysts in the hypertrophied pharyngeal tonsil is a frequent condition. (2) They are more frequent in adults than in children. (3) The anatomical formation of the cysts and the constituents of their contents vary according to their origin and position. (4) The cysts usually originate by retention of the glandular secretion, although other processes have a discharge of lymph in the glandular ducts, and especially hypertrophies and developmental processes in the wall of the lymph spaces. (5) These processes are usually inflammatory in nature.

ZARNIKO.

309. According to the author, the chief disadvantage of the curettes now in use is, that the lower teeth prevent the passage of the curette high enough on the pharyngeal vault. He has therefore had to construct an instrument with a bayonet-shaped blade and a lateral deviation, so that the obstruction of the lower teeth is not encountered, and the hand and arm of the operator have a natural position.

ZARNIKO.

310. BECKMANN regards acute pharyngeal tonsillitis as the most important and most frequent disease in the upper air-passages. It forms, therefore, the most frequent cause of all the other diseases of the upper air-passages: thus, acute infectious purulent coryza, empyema of the accessory sinuses, acute and chronic middle-ear cases, lacuna, angina, and the so-called chronic

catarrh of the upper air-passages. The pharyngeal tonsil is, moreover, the site of infection for acute articular rheumatism, endocarditis, chorea, influenza, scarlet fever, and in many cases for pleurisy, pneumonia, nephritis, osteomyelitis, meningitis, retro-pharyngeal abscesses. A suppurating pharyngeal tonsil is of considerable etiological importance for the symptom-complex of scrofulosis and for the tubercular apical catarrh.

This useful picture of the diseases of the upper respiratory passages and of the middle ear as coming from diseases of the pharyngeal tonsil, leads to a simple form of treatment on firm indications. This consists, in general, upon the use of cutting instruments and dispensing with the brush, the cautery, the syringe, and the rubber bag.

MÜLLER.

311. This is a short, historical study which is probably a supplement to the author's well-known work, or book, on the history of the anatomy, physiology, and pathology of the pharynx.

RAU.

312. A child twelve years of age suffered from a very unpleasant odor from the nose since her third year. Rhinoscopically nothing more abnormal is found than the enlargement of the pharyngeal tonsil. On removing the pharyngeal tonsil, a shoe button surrounded with putrid mucus was discovered. The fetor then disappeared.

ZARNIKO.

313. A very large nasal pharyngeal tumor consisting of two sharply defined parts, the lower larger and very firm, the upper small, soft, connects with a pedicle. Both parts are separated by a ring, which in its horizontal position corresponds to the lower choanal margin, containing a bony, hard cord. Histologically, the tumor presented the typical picture of the naso-pharyngeal fibroma. The cord, after decalcification, was composed of typical bone structure showing the picture of osteoid connective tissue. Three months later, a fibroid tumor was removed which also contained osseous trabecules. The author is inclined to regard these as symptoms of senile involution.

WANNER.

314. MACKUEN reports a case of naso-pharyngeal tumor in a student of pharmacy, with occlusion of the left nostril, deviation of the septum to the right, adhesion between the septum and the right middle turbinal, and partial occlusion of the right nostril. A portion of the tumor, removed under anæsthesia, revealed a granulomatous and inflammatory character without malignancy. After operation a sensation of fulness in the orbital and frontal

regions supervened. During the year infiltration of the tissues of the face on the left side appeared. M. TOEPLITZ.

SOFT PALATE AND PHARYNX.

315. Hubbard, Thomas. Scarlatinous perforations of the pillars of the fauces. *The Laryngoscope*, Oct., 1902.
316. Broeckaert, J. New contributions to the study of acquired and congenital perforations of the palatal vault. *La presse oto-laryngologique Belge*, 1902, No. 9.
317. Macaud. A case of paralysis of the soft palate. *Ann. des mal. de l'or., du lar., etc.*, 1902, No. 10.
318. Voisin. Partial paralysis of the soft palate, of traumatic origin. *Ann. des mal. de l'or., du lar., etc.*, 1902, No. 8.
319. Ritter, S. A contribution to the pathological anatomy of the faucial tonsils. *Arch. f. Laryng.*, vol. xiii.
320. Poliewktow, A. On the treatment of scarlatinous angina with injections of carbolic acid. *Medicinskoje Oboswenje*, 1902, No. 10.
321. Richardson, C. W. Keratosis of the pharynx. *Am. Jour. Med. Science*, Oct., 1902.
322. Gallier, P. Pharyngeal ulcers due to malaria. *Russkij Wratsch*, 1902, No. 41.
323. Tschlenow, M. On lichen planus of the mucous membrane. *Medicinskoje Oboswenje*, 1902, No. 15.
324. Haussel, F. Congenital pharyngeal polyp. *Wiener klin. Wochenschr.*, 1902, No. 50.
325. Zwillinger, H. A clinical and histological study of the diagnosis of certain forms of epipharyngeal sarcomas. *Wiener med. Wochenschr.*, 1902, Nos. 42, 43.
326. Winslow, R. Accessory thyroid tumor of the base of the tongue. *Amer. Medicine*, Dec. 12, 1902.
327. Ferran and Rosenthal. Contributions to the study of hypertrophy of the lingual tonsil. *Lyon médical*, 1902, No. 34.
328. McCaw, J. F. Primary epithelioma of the uvula and soft palate, and treatment with Roentgen rays. *N. Y. Med. Jour.*, Aug. 9, 1902.
329. Shurly, E. L. Tumor of the pharynx; an accessory thyroid gland. Removal followed by myxœdema. *Phila. Med. Jour.*, Sept., 1902.
330. Seligmann, C. G. Endotheliomata of the soft palate. *Brit. Med. Jour.*, May 3, 1902.
331. Root, Arthur G. A case of sarcoma of the tonsil. *N. Y. Med. Jour.*, April 12, 1902.
332. Thorne, J. M. Notching the soft palate for cure of postnasal obstruction in adults. *Brit. Med. Jour.*, April 19, 1902.

315. In cases of scarlatinous, streptococcal angina with deep-seated peritonsillar abscess, perforation of the faucial pillars occurs, which may become permanent, leaving a blind pouch. These lesions, formerly considered as of congenital origin, are,

according to HUBBARD, the result of an abscess or necrosis, unless positively disproven. The importance of scar tissue is overestimated. Two cases, observed in children of four and two years of age respectively, are cited in full. The scarlatinous ulceration is usually bilateral.

M. TOEPLITZ.

316. A young lady presented an oval perforation in the left anterior pillar of the soft palate, the result of a severe attack of scarlet fever with necrosing angina in her seventh year. Congenital defects occurring in the soft palate are, according to the author, an aplasia.

BRANDT.

317. It is not quite certain whether this case is one of genuine paralysis after an attack of diphtheria six weeks preceding, or the mechanical immobilization by an inflamed and enlarged pharyngeal tonsil. The latter opinion seemed to be the correct one, as the soft palate returned to its normal condition after the removal of the pharyngeal tonsil.

ZIMMERMANN.

318. In this patient a typical paralysis of the soft palate had existed for a month after an onset with pain in the neck and chills. The author is inclined to regard this not as the result of diphtheritic infection, but thinks the paralysis is due to the resection of the lingual branch of the facial during the incision practised by the physician.

ZIMMERMANN.

319. Two photographic illustrations of faucial tonsils in which retention cysts (abscesses) are visible.

ZARNIKO.

320. (1) Injections with carbolic acid should be undertaken as soon as the character of the infection is diagnosticated; in other words, usually on the second day of the disease. (2) In the moderate cases, the injections should be repeated every day for four or five days until the temperature drops. (3) In severe cases of scarlatinous diphtheria and swelling of the lymph glands, the injections should be practised for seven or eight days,—fourteen to sixteen injections,—during which time the urine should be carefully examined. (4) The dose for small children is 0.015 pure carbolic acid up to 0.03 per day; grown children (six to eight years) twice as much.

SACHER.

321. The histological changes in the epithelial structures prove a keratosis of the faucial and pharyngeal mucous membrane in the condition commonly known as pharyngomycosis. The changes begin in the subepithelial structures, and are identical in the naso-pharynx, pharynx, or fauces. Leptothrix is not a

constant factor, most frequently found on tufts in the fauces, more rarely in the pharynx, never in the naso-pharynx. It is an accidental deposit and has no causative relation to structural changes. There is a condition in the pharynx, occurring in the very young and the aged,—a true mycosis; true keratosis occurs in middle life.

M. TOEPLITZ.

322. A patient, forty-five years of age, suffered since 1898 with malaria. In May, 1901, five small erosions were noticed on the posterior and lateral pharyngeal wall, which greatly enlarged and formed an ulcer 3cm by 1½cm. The ulcer was quite deep; the margins were thickened; it was partly situated in the posterior and partly in the right lateral wall of the pharynx. The disturbance in swallowing was so great that even fluid could not be taken without great discomfort; there was marked anæmia; there were no signs of syphilis or tuberculosis; specific and local treatment was resorted to. Microscopic examination did not disclose any signs of cancer. Quinine and arsenic were given internally. Quinine subcutaneously by enemas and stomach-tube saved the patient's life. The ulcer healed in a short time.

SACHER.

323. Lichen planus occurs most frequently in the buccal mucous membrane. It usually begins just as the disease of the external skin, though sometimes precedes the latter and may be isolated. It usually develops after the appearance of a disease of the skin. The clinical picture is so characteristic, that its diagnosis does not present difficulty. The pathological anatomy of the disease has not been determined; its etiology and pathogeny are not clear. Prognosis in general is favorable. Its treatment consists in the proper and energetic use of arsenic.

SACHER.

324. On examining the pharynx on the left side, a tumor as large as the small finger was noticed. In addition to that, the left posterior palatal arch was missing. The tumor is shiny and of deep red color; at one point, bluish red; it is hard to the touch. The attachment is lateral, directly underneath the orifice of the Eustachian tube. Histologically, the typical structure of a dermoid tumor was shown.

WANNER.

325. In order to clarify the difficulties connected with the differential diagnosis between certain forms of sarcoma of the epipharynx and preceding hyperplastic pharyngeal tonsils, the author has collected a number of cases out of the literature with the

histological picture of adenoid vegetation developed into lympho-sarcomas, and cites a case which originally presented an enormous hyperplasia of the lymph tissue of the naso-pharynx and rapidly recurred after removal. Death followed after a number of months.

Even histological examination of the tumor masses may be uncertain, unless it is possible to remove a part of the tissue from the limiting area.

Important from a differential diagnostic standpoint, the malignant tumors are characterized by a rapidity of growth, restriction of growth to one-half the naso-pharynx, development of the hard glandular swelling, tendency to hemorrhage, suppuration of the soft palate from the posterior pharyngeal wall, the hanging down of the tumor on one side, and especially the spontaneous breaking off of certain fragments.

WANNER.

326. A girl, aged seventeen, had a growth in front of the epiglottis, which made the voice muffled and produced difficulty in swallowing. It was about half the size of a hen's egg and was enucleated from without through an incision made in the median line from the chin.

327. A short, explicit article on the etiology, symptoms, diagnosis, and treatment of hypertrophy of the lingual tonsil. The most important symptoms are the sensations of a foreign body, the tendency to swallow and clear the throat, dry attacks of coughing similar to hysterics, occasionally pain localized in the region of the lingual bone. If the symptoms are pronounced, radical treatment is indicated. The destruction of the tonsil with the galvano-cautery in a number of sittings at weekly intervals is recommended.

RAU.

328. A woman, aged thirty-seven, had three small ulcers on the soft palate, which, after $6\frac{1}{2}$ months, enlarged and filled the throat with a hard mass involving the uvula, velum palati, each posterior faucial pillar, the right lateral and a portion of the posterior wall of the pharynx on the right side; it had an irregular, nodulated outline and an ulcerated and necrotic surface, and proved microscopically to be an epithelioma. The growth was removed as freely as possible with curette and electro-cautery knife. After two weeks the wound, when beginning to cicatrize, was subjected to the application of the Roentgen rays, protecting the mouth, tongue, lower part of face and neck by sheets of block tin, and the upper part of the face by heavy tinfoil. The

exposures were made three times a week for seven weeks, when only one small area as large as a split pea remained unhealed. After an interruption of this treatment for three weeks, marked increase in the area of ulceration and infiltration of the velum and right lateral and posterior pharyngeal walls took place, which necessitated another removal of the growth with curette and cautery. Microscopically there was now found, in addition, a very rapid colloid degeneration of the epithelial cells replacing the protoplasm.

M. TOEPLITZ.

329. In a girl, æt. sixteen, the laryngoscope revealed a dark-red, globular, smooth, broadly pedunculated tumor, about the size of a small hen's egg, attached well down at the very base of the tongue, a little to the right of the median line, and in juxtaposition to the epiglottis, but not infringing much upon it. It was diagnosed as adenoma, owing to the history of progressive increase of subjective symptoms, such as a desire to swallow, difficulty of deglutition, extra secretion of mucus, and frequent expectoration, with apparently good general condition. The removal of the growth with the snare was followed by considerable bleeding, and marked signs of myxœdema developed later, which were eliminated by thyroid extract. A full survey of the literature on the subject is given.

M. TOEPLITZ.

330. SELIGMANN, at a meeting of the Pathological Society of London, held on April 29, 1902, drew attention to two tumors of the soft palate, which he regarded as endotheliomata. They occurred in patients, aged fifty-six and forty-three years respectively. In neither of them were there any enlarged glands or other signs of metastasis.

ARTHUR CHEATLE.

331. ROOT's patient, a man, aged twenty-three, began his illness with an ordinary cold and a persistent cough, painful deglutition, swelling of the left tonsil, with abscess formation and hemorrhage from it. The swelling pressed the anterior pillar forward and upward, extending downward below. The margin of the epiglottis was hard, of irregular surface, injected without ulceration, with large firmly attached base and of boggy consistence. The left cervical glands were involved. It was operated from without with ligation of the common carotid twice within six days. Relapse took place after five months, and death three weeks later. The tumor was a short spindle-celled sarcoma.

M. TOEPLITZ.

332. Under an anæsthetic the margin of the soft palate is seized, midway between the anterior pillar and the uvula, with vulsellum forceps; a cut on each side, meeting above, is then made with scissors for half an inch, and the piece removed. THORNE has done this in two instances with beneficial results.

ARTHUR CHEATLE.

BOOK NOTICES.

VII.—**Patologia e terapia del orecchio e delle prime vie aeree (otologia, rinologia, laringologia).** By GIUSEPPE GRADENIGO, Professor, University of Turin. Turin: S. Lattes & Co., 1903.

This volume, of 968 octavo pages, just published, comprises the lectures of the distinguished author, collected and edited by his assistant, Dr. E. S. CASSANELLO, specialist for ear, nose, and throat diseases in Montevideo. The special literature is followed up to the beginning of the year 1903. The reader may easily keep acquainted with the subsequent literature, from the two general reviews published in German: (1) *Internationales Centralblatt für Laryngologie*, by SEMON, of London—August Hirschwald, Berlin, publisher; and (2) *Internat. Centralblatt für Ohrenheilkunde*, by BRIEGER and GRADENIGO—A. Barth, Leipzig, publisher.

GENERAL PART, PP. 1-228.

The *first lecture* demonstrates that the ear, nose, and throat form anatomically, functionally, and technically a kindred field of work. The *second* describes in a very instructive manner the functions of the upper air-passages in regard to their pathology, as organs of defence, and of adaptation of their air-current to respiration, and sensory actions—taste, smell, and hearing,—by means of warming, moistening, and sterilizing the tissues. This chapter is illustrated by several very good text-figures, by W. CALAMIDA, MORITZ SCHMIDT, and WALDEYER, whose annulus lymphaticus is presented, slightly schematic. The *third* and *fourth* lectures are devoted to the etiology and symptomatology of the diseases of the upper air-passages. The *fifth* describes the normal condition of the parts, with many good engravings; the

sixth, the instruments and methods of the objective examination. Lectures VII. and VIII.: functional examination of the nose (Zwaardemaker's olfactometer), etc., the pharynx and the larynx (technique of the examination of taste). The examination of hearing is presented with great detail. Lecture IX.: medical treatment; syringing nose and ear. General and local medical treatment. Lecture X.: the bloody operations on nose, pharynx, and larynx. Abuse of endonasal surgery; danger of infection. Lecture XI.: bloody operations on the ear. Lecture XII.: application of electricity for diagnostic and therapeutic purposes. A very detailed exposition of this interesting subject.

SPECIAL PART.

In Lecture XIII. the acute inflammation of the nose, pharynx, and larynx is described, side by side, pointing out their general characters and their differences. Lecture XIV.: acute otitis m. pur. Lecture XV.: the simple chronic catarrhal affections of the upper air-passages. Different clinical types. Hypertrophied tonsils and their removal (Fahnstock, 1833, Mackenzie, Ruaut; knife or scissors when tonsil is drawn with forceps in front of their niche between the arches of the palate; hemorrhage, especially in grown people, best avoided by removing tonsils in fragments). Lecture XVI.: ozæna. Lecture XVII.: hypertrophy of the *pharyngeal* tonsil. "In the majority of cases, digital palpation will, with saving time, let you recognize the presence of the hypertrophy." "The third [!] finger of the right hand is introduced under well-known precautions, and the naso-pharyngeal cavity is explored with great practical advantage; not only the existence of the hypertrophy is recognized, but also its degree and consistence." Lecture XVIII.: otit. med. sicca, affections of the tube. Lecture XIX.: Ot. m. p. c. Good description of ossiculotomy. Lecture XX.: the mastoid and intracranial complications of otitides. The author says to his audience, he has to be very brief in this most important subject of his lectures; he will have to limit himself to give them a general idea of these frequent and most dreaded complications, so that they would be able to recognize and cure them. Lecture XXI.: inflammations of the nasal sinuses (max., front., ethmoid., sphen.). A good presentation. Lecture XXII.: diseases of the peripheric apparatuses of special sense: olfaction, taste, hearing, and equilibration. Labyrinthitis. Ménière's syndrome, hysteria, etc.

The remaining ten lectures treat of different conditions which constitute interesting reading and useful knowledge, though they do not lend themselves readily to systematic presentation. Lecture XXIII.: disturbances of general sensibility; reflex phenomena of the nose, pharynx, larynx, and ear. Lecture XXIV.: disturbances of motility of the velum palatinum and larynx; paralysis of the recurrent nerves of the larynx, and other nerves. Lecture XXV.: syphilis, and Lecture XXVI.: tuberculosis of the upper air-passages and the ear. Lecture XXVII.: neoplasms. Lecture XXVIII.: diphtheria and other infectious diseases. Lecture XXIX.: stenosis and foreign bodies. Tracheotomy and intubation. Lecture XXX.: hemorrhage and traumatism. Lecture XXXI.: external nose and ear. Congenital malformations. Lecture XXXII.: infirmities of hearing and speech: deafmutism and stammering.

The large book of Gradenigo should not be judged with the same rigourousness as a systematic text-book of which Politzer's is a standard, but as a series of essays on a well-defined group of diseases, which the adept as well as the beginner will read with delight, style and typography being excellent.

H. KNAPP.

VIII.—First Principles of Otology, a text-book for medical students. By ALBERT H. BUCK, M.D., Clinical Professor of Diseases of the Ear, College of Physicians and Surgeons, Medical Department of Columbia University. Second edition, New York, William Wood & Co., 1903.

In 1899 the first edition was prefaced, that the students of medicine at the College of Physicians and Surgeons of New York could not in their overburdened curriculum, even in the four years' course, master the contents of a middle-sized text-book of otology, but they should have a guide-book at hand that would aid them in making themselves familiar with the primary facts and theories which by lectures, dissecting, diagnostic and clinical instruction, would enable them to recognize and treat understandingly the ear diseases which usually come before the general practitioner, which is equivalent to the amount of knowledge required for their graduation. The little book, having shown itself subservient to these purposes, now appeals in a revised edition also to the students of other colleges.

The book has 216 small-octavo pages, is well written, contains

a number of illustrations, and can be recommended to students who endeavor to acquire in their college course the foundation for an all-round scientific and practical medical education.

H. K.

IX.—A Thesaurus of Medical Words and Phrases, by WILFRED M. BARTON, M.D., Assistant Professor of Therapeutics, etc., Medical Department of Georgetown University; and WALTER A. WELLS, M.D., Professor, Washington Postgraduate School. W. B. Saunders & Co., 1903. Flexible leather, \$2.50.

This is an elegantly printed and bound book, full of information and very useful: every word used, every derivative and compound are accompanied by their versions in Latin, Greek, or other languages. It contains all the words a medical student or a medical writer need know; and the explanations supplied by an equivalent in French, Latin, or Greek, printed in conspicuous antique type, are all one can desire. It is a pleasure to handle this book; the reviewer has never seen a handier and better gotten-up dictionary.

H. KNAPP.

MISCELLANEOUS NEWS.

APPOINTMENTS.

V. COZZOLINO, professore straordinario since 1894, was appointed professore ordinario of otology and rhinology at the University of Naples, Italy, in June, 1902.

The honorary professor in ordinary, Dr. HERMANN SCHWARTZE, privy medical councillor, has lately been appointed professor ordinarius of otology at the University of Halle. This is not only a well-deserved honor for the eminent otologist, but an official recognition of the importance of aural surgery in the curriculum of the student of medicine. The day cannot be far distant when otology will have its place in the final examination of the German candidate for his license to practise. At last: "*To merit its crown!*"

Dr. ALFRED DENKER, in Hagen, Westphalia, has been appointed professor of otology, rhinology, and laryngology, as well as executive surgeon of the clinic and dispensary at the University of Erlangen, Bavaria, succeeding the late distinguished Professor KIESSELBACH.

Dr. WM. L. BALLENGER, well known as practitioner, teacher, and author, has been elected by the Faculty of the College of Physicians and Surgeons, Chicago, to the chair of otology, rhinology, and laryngology, to fill the vacancy made by the resignation of Prof. M. R. BROWN.

Dr. HERMANN PREYSING, late assistant to Professor Körner's clinic at Rostock, well known to our readers by valuable publications on otogenous brain-abscess and other serious complications of suppurative middle-ear disease, has become a privat-docent at the University of Leipzig, for otology, rhinology, and laryngology.

DEATHS.

Dr. OSCAR HEIKE, of Breslau, royal Prussian sanitary councillor, otologist of a good deal of reputation, colaborer of the *Arch. f. Ohrenheilkunde*, died of apoplexy unexpectedly during his vacation in September, 1902.

Dr. ANTON SCHWENDT, a capable and esteemed otologist in Basel, Switzerland, and privat-docent at the University, died suddenly in his forty-eighth year.

Professor SCHWARTZE, of Halle, announces, in warm and impressive words, the sad decease of one of his pupils, Dr. Anton Cramer, aged twenty-nine, from septic poison in consequence of an injury to one of his fingers during attendance on a patient in the hospital. In spite of all the care and attention bestowed on him at the surgical clinic, the fatal issue could not be averted. In the face of this sad event Professor Schwartz earnestly warns his colleagues not to underrate the danger ever inherent in the handling of patients.

EDITORIAL NOTICE.

The **Archives of Otology** is a bi-monthly journal, published in annual volumes of about five hundred pages each, extensively illustrated with cuts in the text, half-tone text plates, and lithographic plates, many in colors. About three-quarters of the space is devoted to original papers, and the remaining quarter to a systematic report on the progress of otology, and to reports of societies, book reviews, and miscellaneous notes. The papers and reports are original, and only accepted with the understanding that they are to be published in this journal exclusively. The original papers in the English edition appear in the German (*Zeitschrift für Ohrenheilkunde*) either in full or in more or less abridged translations, and *vice versa*. Any subscriber who wishes to refer to the original text of a translated or abridged paper may, by applying to the editor, obtain a reprint which he is expected to return after perusal.

The subscription price of the ARCHIVES OF OTOTOLOGY is \$4.00 per year, payable in advance. The price per number is \$1.00. The ARCHIVES is sent postage free in the United States, Canada, and Mexico.

The **Archives of Ophthalmology** is a companion journal of the ARCHIVES OF OTOTOLOGY with the following differences: The editors are Dr. H. Knapp of New York, and Dr. C. Schweigger of Berlin. The title of the German edition is *Archiv für Augenheilkunde*, edited by Dr. H. Knapp and Dr. C. Schweigger. The bi-monthly numbers are issued alternately with those of the ARCHIVES OF OTOTOLOGY, beginning with January. The annual volumes contain about six hundred pages. Price, \$5.00; single number, \$1.00.

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ARCHIVES OF OTOLOGY.

ON HEMORRHAGE FROM ARROSION OF THE BRAIN SINUSES IN SUPPURATION OF THE TEMPORAL BONES.

BY DR. H. EULENSTEIN, OF FRANKFORT-ON-MAIN.

Translated by Dr. H. KNAPP, from German Edition (*Zeitsch. f. O.*, vol. xliii.).

THOUGH by the frequent destruction of its bony sulcus the lateral sinus loses a good deal of its resistance, it is very rare that hemorrhages by arroasion of its walls occur. The reason of it is that an obturating thrombus forms before the sinus wall gives way, a fact made known long ago by WREDEN, who, in the *Monatsschrift für Ohrenheilkunde*, No. 10, 1869, collected the previously published cases.¹ The hemorrhage may be *more or less copious* according as the obturating thrombus is more or less complete, or the perforation of the sinus wall larger or smaller. The hemorrhage may be *external* or *internal*: the former when the blood through the opening in the sinus wall makes its way through the cavities of the petrous bone into the external ear canal and the naso-pharyngeal space; the latter when the blood enters into the middle or posterior cranial fossa. All brain sinuses that are in relation with the temporal bone may occasion the hemorrhage: the lateral, both petrosal, the cavernous, the carotid, and the jugular bulb.

¹ Hooper, *Morbid Anatomy of the Brain*, 1826, quoted by Cruveillier: *Anatomie pathol. du corps humain*, 1830-1842, Livr. viii., pl. 4, p. 3. Bruce, *London Med. Gaz.*, 1841. Stokes, *London Med. and Surg. Jour.*, vol. v., p. 676. Toynbee, *Med. Times and Gaz.*, 1855, T. x., pp. 3, 228, 306, and *Med.-Chir. Trans.*, vol. xxxiv., 1851. Virchow, *Arch. f. path. Anat.*, Bd. viii., p. 378. Hensinger, *ibid.*, xi., p. 92. Griesinger, *Wagner's Arch. f. Heilk.*, iii., p. 448. Wreden, *Otit. med. neonat.*, Berlin, 1868.

To the seventeen cases (see below) I can add another which I deem worthy of publication.

Clinical History.—Else B., æt. five years, healthy constitution, caught scarlet fever January 8th. Earache the 14th; first seen the 15th. *Mt* very red, sagging in post. half. Temp. 39° C. Urine normal. R mast. proc. tender, its integument normal. Hearing, R, diminished. Immediate paracentesis draws pus and abates pain. During the next four days otorrhœa copious, temp. 37.9°–39° C. Urine continues normal. Tenderness of mastoid increased, doughy swelling of its integuments.

Jan. 20th, 8.30 A.M.—**Opening of the mastoid** under general anæsthesia. Large quantity of pus; the mastoid process markedly pneumatic, all cells filled with pus, the partition walls decayed, and also the posterior meatal wall softened. Granulations filled the antrum and beset the dura of the middle cranial fossa, which was opened. The entire outer wall of the mastoid was diseased and had to be removed to the very tip. Posteriorly the disease of the bone had advanced to the sigmoid sinus which was exposed to the extent of 3*cm*. Opening the posterior cranial fossa uncovered a large extradural abscess at the sinus. The sinus showed distinct respiratory motions, showing that no obturating thrombus was present in the lateral sinus. The middle portion of the exposed sinus was covered with granulations; the remainder looked healthy. Even if a parietal thrombus was in process of development we could expect that no serious harm would ensue to the patient, as she had no pyæmic temperature and no chills. The large wound cavity was filled with sterile gauze, and the usual aseptic dressing applied.

In the next three days the temperature varied between 37.5° and 39° C. General condition perfectly satisfactory.

Jan. 24th.—Change of dressing. The wound looked healthy, except the granulating patch at the sinus wall, which was covered with yellow pus.

Jan. 27th.—Change of dressing again. Granulations at many places of the wound cavity; at the posterior meatal wall and near the mastoid tip a few white, bare bone patches were visible. The purulent membrane on the sinus wall apparently a little thicker than at the first dressing.

Jan. 29th.—Dressing changed because of being soaked with secretion.

Jan. 30th.—In the afternoon the mother noticed a few drops of blood oozing from beneath the dressing; the dressing itself was not suffused with blood. Some sterile cotton-wool was shoved under the dressing; no blood made its appearance for the present. During the night had several attacks of sneezing.

Jan. 31st, 5.30 A.M.—I was called in all haste, as a profuse bleeding had occurred. I found the dressing and part of the pillow soaked with blood. There was, however, no oozing of blood at any part of the dressing. On removal of the dressing down to the tampon filling the wound, I satisfied myself on careful observation that there was no oozing now. For the sake of precaution—convinced that the hemorrhage emanated from the sinus—I pressed a tampon of sterile cotton-wool firmly on the gauze plug which lay in the wound and fastened it with a compressive bandage. The pulse of the child was good. During the day there was no more bleeding, but the temperature rose to 39.2° C. in the evening, which induced me to renew the dressing. When I raised the tampon with a forceps ever so gently at its upper edge, a broad, darkened blood stream gushed forward, flooding the neighboring parts instantaneously. Under these circumstances a change of dressing was out of the question, and I had to limit myself to press the somewhat loosened plug firmly again into the wound cavity, upon which fortunately the bleeding stopped. The situation was by no means enviable: a howling child, struggling with hands and feet to the utmost on the lap of a mother trembling and deadly pale from fear and excitement; I had firmly to compress the tampon for about twenty minutes in order to be sure that the powerful bleeding was really stopped. I put a fresh compressive bandage over the tampon and instructed the nurse to press strongly on a marked point of bandage should any bleeding again take place. The night passed without any bleeding; the child was restless, feverish, and complained of pain in the wound.

During the next three days the temperature varied between 37.8° and 40.3° C. The child was very restless, suffering greatly, pale and weak by the loss of blood, and the grave infectious disease. Its condition was very critical. The old tampon, soaked with blood, could not be removed for fear of starting a new copious, perhaps fatal, hemorrhage again, whereas its continuation threatened the child's life by retention of pus, and decomposition of the secretion of the wound, and above

all by producing septic thrombosis in the open sinus and grave pyæmia.

When on February 4th, after a rise of the temperature from 36.9° to 40.5° C., a violent chill set in, the fight against the twofold enemy had to be taken up anew. The attempt to lift the external plug, bringing about the occurrence of a new hemorrhage, which stopped, however, immediately on putting the tampon in its place again, made it evident that we could succeed only by controlling the hemorrhage on the one hand and the development of pyæmia on the other. In accordance with this plan, I decided to ligate the internal jugular, and then to expose the lateral sinus above and behind the arroded place, compress it with the finger, and replace the old dangerous tampon by a fresh sterile one, this to be done while reducing, sufficiently for the purpose, the hemorrhage possibly arising from the sup. petrosal sinus and the emissary mastoid vein, which empty themselves below the projected place of compression. After this operative scheme had been approved by the family physician, Dr. Beil, and the surgeon-in-chief of the Citizens' Hospital, Dr. Ebenau, and after a second chill had occurred in the morning of February 5th, with temp. 39.6° C., the operation was begun at 12.45 P.M. the same day. Dr. Ebenau ligated the internal jugular and the facial vein doubly, severed them, stitched the skin wound loosely, whereupon the external dressing was removed. While I secured the tampon in the wound with my finger, Dr. Ebenau exposed, with the rotating burr, the lateral sinus about midway between the knee and the torcular, enlarging the opening with the bone forceps. While Dr. Ebenau was firmly compressing the sinus with his finger, I removed the uppermost plug without any bleeding. On removing the deeper plug and the strip of gauze which occluded the sinus, a smart stream of blood from the sup. petrosal sinus flowed out, but was promptly controlled by a sterilized iodoform-gauze strip which Dr. Ebenau firmly pressed on and into the opening of the sinus. While he continued to compress the newly exposed sinus with one finger, and held the gauze in the old wound fast with the other, I freed the wound of the projecting and necrosed particles of bone, and syringed out the ear, which was full of pus, with a solution of boric acid until the water ran freely through the antrum; I filled the wound cavity with strips of gauze; the free end of one was drawn over the lower corner of the wound, the other over the upper, for better orientation in changes of dressing later on.

The upper wound, made to bare the lateral sinus, was closed, and the ordinary dressing applied.

Course of Healing.—The next three days showed little reaction. Pulse from 39.5° – 37.5° C. February 8th, change of dressing, in narcosis, at a temperature of 38.7° C., on account of strong soaking of the dressing with secretion from the wound. The superficial plug was first removed, and the ear syringed with warm solution of boric acid. The strip of gauze pressed upon the spot of the former bleeding was softened with warm boric-acid solution and then removed. In the same moment a stream of almost black blood burst forth, though not so vehemently as before, the breathing stopped, the face became cadaverous, no pulse could be felt. At once a new strip of gauze was pressed on the bleeding place, and after a prolonged massage of the heart, respiration and pulse returned. During the next seven days the recovery progressed steadily. February 15th, change of dressing without narcosis. No bleeding. At the arroded place the sinus wall looked dark grayish-red. Pulse satisfactory; general condition excellent.

The recovery continued regularly. The sinus wound was healed on March 3d; the recovery of the tympanic cavity was slower; on account of the persistence of otorrhœa the antrum had to be kept open and scraped out several times. In June, 1902, the wound was reduced to a tiny fistula, in which a small sequestrum, not yet loosened, was felt.

EPICRITICAL REMARKS.

This case is another example of the tendency of scarlet-fever tympano-mastoiditis toward rapid and extensive destruction of soft and hard tissues. In spite of the early paracentesis, the decay of bone continued and the infection entered the cranial cavity, causing an epidural abscess and a corroding ulcer of the sigmoid sinus, the perforation of which, perhaps favored by attacks of sneezing, led to profuse hemorrhage, which in spite of careful tamponing repeated itself several times, the first plug remaining undisturbed in position six days, the second four days. The direct plugging of the sinus was only temporarily efficient, and therefore, in future similar cases, I would resort to

apply the tampon not only to the opening of the sinus but extend it peripherally between the bone and the sinus (as recommended on another occasion by FR. WHITING and E. MEIER) and then go on with the operation if necessary, or in difficult and dangerous cases, where mere local plugging is not sufficient to do what we did in the case under consideration, to shut off the blood current from below by tying the internal jugular vein, exposing the lateral sinus above its knee, and keep it compressed with the finger during the operation, a procedure which, as far as I conclude from the *subsequent literary references*, has not yet been tried in cases of hemorrhage from the lateral sinus.

These references are as follows:

1. Case of SYME (*Edinburgh Med. Journ.*, 1833, quoted by GIDON, *Thèse de Paris*, 1877).

Eleven-year-old child. Scarlet-fever mastoiditis R. Repeated copious bleeding on six consecutive days. On the supposition of its originating in the carotid, the latter was tied, after which the bleeding was slightly lessened. Death two days later during cerebral symptoms. Post-mortem revealed an *opening in the ulcerous lateral sinus* as its cause.

2. Case of COURTIN (*Société anatomique*, 1848, quoted by MARCÉ: *De l'ulcération de la carotide interne dans la carie du rocher*. Paris, 1874.

A thirty-year-old consumptive. Chronic otorrhœa R. First slight bleeding from the right ear-canal, later on facial paralysis, pressure, tenderness of the right mastoid process; in a few weeks copious ear-bleed, ending fatally in one and one half hours. Post-mortem: *Extensive caries of the petrous bone up to the right sinus, which was perforated*.

3. Case of HUGUIER (*Bulletin de la société de chirurgie*, 1851, cited by MARCÉ (*l. c.*).

Woman of fifty. Chronic foetid suppuration from the right ear. Extraction of a piece of a probe from the external ear-canal. Seven days later copious venous hemorrhage from the ear; death in two days. Post-mortem: *Extensive destruction of the petrous, with openings in the cavernous sinus, both petrosal sinuses, and the jugular bulb*.

4. Case of TROELTSCH (*Anatomie des Ohres*, 1860, p. 50).

Acute purulent otitis media, leading rapidly to softening and ulceration of the bone with pyæmic symptoms, ending in death after several copious bleedings from the lateral sinus.

5. Case of GRUBER (*Wiener med. Zeitschr.*, N. F., 1860, Bd. iii., p. 448, cited by WREDEN, *Monatschr. f. Ohrenh.*, 1869, 10.).

Ear-bleeding, originating in the sinus, had ceased a few days before death. (Further references wanting in the citation. The original was inaccessible to me.)

6. Case of SANTESSON (*Hygiea*, Bd. xiv., reported by v. D. BUSCH, *Schmidt's Jahrb.*, Bd. cxvi., S. 250).

Even if the report does not mention the presence of a hemorrhage, the autopsy demonstrates that an internal bleeding has occurred *in vivo*. Post-mortem: Extensive caries of the petrous portion. At the base of the skull the dura mater in the posterior half of the left petrous part adjacent to the lateral sinus was detached from the bone through a partially blackish-gray, dirty mass, and decayed, and to a certain degree dissolved, coagula of blood. The bone was broken through 10''' in length and 8''' in breadth, and totally destroyed. The wall of the lateral sinus corresponding to the affected bone showed a small perforated ulcer. The hole in the bone led into a cavity in the interior of the petrous bone, containing fragments of necrosed bone and particularly dissolved blood-coagula. The cavity occupied the greater part of the interior of the petrous, and extended from its base to the internal ear-canal. The carotid canal was likewise arroded and perforated.

7. Case of KÖPPE (*Arch. f. Ohrenheilk.*, ii., 181).

Man of twenty-one years. R. chronic otorrhœa. Moderate continual hemorrhage from nose and ear for several days. Death. Post-mortem: A hole $3\frac{1}{2}$ ''' long by $2\frac{1}{4}$ ''' broad, in the wall of the lateral sinus, where it lies at the posterior face of the petrous bone. This case of Köppe is erroneously ascribed by Gidon (*Thèse de Paris*, 1877) to Rapp and taken over into German literature. The case of Rapp is to be cancelled.

8. Case of ZAUFAL (*Wiener med. Wochenschr.*, 1868, 40-41). Left ot. med. pur. chr. Copious bleeding from the left ear, stopping by itself. Death later, disconnected from the hemorrhage. Autopsy: Caries of temporal; thrombus in sigmoid sinus; destruction of the mastoid emissary vein—obliterated at both ends. The bleeding was caused by the laceration of a vein in its course through a cavity filled with ichor.

9. Case of WREDEN (*Monatschr. f. Ohrenheilk.*, 1869, 10.).

Twenty-year-old man. Chronic otorrhœa R., on the fourth day fatal internal and external bleeding from the right lateral sinus, which was perforated toward the brain by a carious mastoid.

10. I. Case of BÜKE (*Arch. f. Ohrenheilk.*, xx., 48).

Man of twenty-two. Left chronic otorrhœa and facial paralysis. Suddenly, without any external occasion, occurrence of copious bleeding of the left ear, stopped by injection of cold water. In the course of two weeks it repeated several times, but was each time stopped by cold water. At the end of the second week, however, a very severe hemorrhage with spasms set in suddenly, and the patient passed away after a short agony. Post-mortem: Tegmen tympani and anterior and lower tympanic walls destroyed. The posterior wall of the internal carotid facing the tympanic cavity was discolored, dirty-brown, but not perforated; the bony wall of the facial canal was carious in its whole extent, the upper wall of the jugular bulb was shattered, perforated; the bleeding came from the bulb and probably also from the stylo-mastoid artery.

11. II. Case of BÜKE (*Arch. f. Ohrenheilk.*, xx., 49).

Man of forty-four. Chronic otorrhœa L. Copious bleeding from the ear-drum, stopping on instillation of liq. ferri sesquichlor. Three days later profuse bleeding, causing death in a short time. Autopsy: Caries of the tegm. tymp. and the inferior petrosal sinus, which was destroyed; communicated with the tympanic cavity, and caused death by hemorrhage.

12. Case of KUHN (*Arch. f. Ohrenheilk.*, xxii., 162).

Acute caries of right petrous bone. On the fourteenth day fatal bleeding from sup. petr. sinus. On the posterior upper part of the drum cavity a perforation in the bone of 2cm in length and 1.2cm in depth, extending up into the sup. petr. sinus; the dura above it destroyed to the same extent.

13. Case of v. BECK (*Beiträge zur klinischen Chirurgie*, v. BRUNS, xii., Fall 9).

Chronic suppuration of the left ear with caries of the mastoid process. Profuse venous bleeding on the seventh day after operation.

Tamponing. Bleeding again in an hour. Collapse and death. Autopsy: Extensive caries in the petrous bone, abscess in cerebellum and medulla oblongata. Caries of the atlas and petrosus. The hemorrhage originated in the bulb of the jugular vein.

14. Case of LEDERMANN (reported in ARCH. OF OTOL., xxxi., 77, Case 3, and in German *Zeitsch. f. O.*, xxx., 78, Case 3). Chronic otorrhœa right. Radical operation; about four weeks later bleeding from mastoid through ear, nose, and throat. After a second bleeding from the rhino-pharyngeal cavity, posterior tamponade. In three days death from the loss of blood. Post-mortem: Extensive necrosis of the petrous or mastoid parts, ulcerous decay of the wall of the lateral sinus. Softening of the left temporo-sphenoidal lobe.

15. Case of GRUNERT (*Arch. f. O.*, xl., 222). Man of thirty-five years. Cholesteatoma. Retro-auricular ichorous abscess the size of a fist. Radical operation. The middle-ear spaces and the external ear-canal converted into one large cavity, filled with a decaying cholesteatoma which extended to the dura mater and sent off shoots between the dura and the roof of the petrous pyramid into the cranial cavity. On palpation of the cavity backward a sinus bleeding in a black stream as thick as a finger suddenly occurred, but was controlled by prolonged digital compression so as not to prevent the finishing of the operation. The cause of the bleeding proved to be a softening and invasion of the sinus wall with cholesteatomatous matter.

16. Case of BLOCH (*Verhandl. d. deutsch. otol. Gesellschaft*, 1896). Older man with chronic otorrhœa right, from caries and cholesteatoma. Radical operation. In curetting the anterior lower part of the drum a powerful stream of dark blood welled out of the wound. Tamponade. No renewed bleeding. More than a year after the operation, repeated hemorrhages occurred from the operated ear, also from the mouth and nose, only when he was lying down. One of these attacks was accompanied by suffocation and terminated fatally. The last bleeding originated in the carotis; the first not in the jugular bulb as was supposed, but in the carotic sinus; the anterior wall of the drum, the part between the middle ear and the carotic canal, was totally destroyed by caries, creating a wide gap between both cavities. Even if the first bleeding was traumatic, the case has to be mentioned here, as it was not sure whether the subsequent bleedings, with exception of the last, which came from the carotic, did not originate in the carotic canal.

17. Case of GRUNERT and ZERONI (*Arch. f. O.*, xlix., p. 184). Chronic suppuration with cholesteatoma in the right middle ear. External gangrenous pachymeningitis. Extradural abscess.

Purulent sinus thrombosis. Total chisel-operation; sinus operated on with tying the jugular vein. Pyæmia cured. After the removal of a bridge of bone left between the sinus wall and a fistula found at the base of the skull, the softened wall of the lateral sinus suddenly burst. The moderate hemorrhage suggested a partial thrombosis of the sinus.

Including my own case there are eighteen cases on record where hemorrhages from the brain sinuses, including the jugular bulb, occurred by arrosion of their walls caused by suppuration in the temporal bone. Twelve of these refer to the lateral sinus, 1 to the superior petrosal (Kuhn, 12), 1 to the inferior petrosal (Böke, 11), 1 to the sinus caroticus (Bloch, 16); to several sinuses at the same time, viz., superior and inferior petrosal, the jugular bulb, 1 (Huguier, 3); the jugular bulb, 2 (Böke, 10, and v. Beck, 13). Thirteen cases occurred in chronic suppurations, 4 in acute, 1 no statement.

As *causal factors* are mentioned: scarlet fever, phthisis, cholesteatoma; in most cases no etiology statement is made.

The *age* of the patients varied between five and fifty years.

The *sex* is mentioned in eleven cases: nine males, two females. This preponderance of the male sex agrees with the statements of Bürkner, Körner, Hessler, and others concerning the prevalence of the male sex in contracting purulent diseases of the ear and their intracranial complications.

A *single attack* of hemorrhage is noted in nine cases, in three of which it was continuous for several days; *repeated hemorrhage* was met with in the same number.

Death occurred in eight cases during or soon after it (up to a few days) in consequence of it, in five days not directly after it, including the case of Bloch, as the fatal hemorrhage originated in the carotis.

Recovery occurred in three cases—Grunert (15), Grunert and Zeroni (17), Eulenstein (18).

The *places of perforation*, as far as they are specified, are to be found in the report of the cases.

The *time of the operation* was in six cases before the oper-

ation, the *method* was the radical operation in five cases (Ledermann, v. Beck, Bloch, Grunert, Grunert and Zeroni); in one the simple anthrectomy with opening of the middle and posterior cranial fossæ [and temporary opening and digital compression of the tranverse portion of the lateral sinus during the operation] (Eulenstein).

The *time of the occurrence* of the bleeding in the *operated cases* was four weeks (Ledermann), seven days (Beck), one year (Bloch). In the *cases* of Grunert (15), and Grunert and Zeroni (17), the non-traumatic hemorrhages took place during the operation; in Eulenstein's case (18), ten days after it.

The *bleeding was internal* in sixteen cases, external in one, and simultaneously internal and external in one.

The *distinction* between arterial and venous hemorrhage is easy: according as the blood is bright red and jerks out periodically with the pulse, or is dark red (in some cases almost black) and escapes in an even stream.

Hessler¹ draws attention to the fact that arterial hemorrhage in ear disease is stopped by compression of the carotis at the neck; as with the carotis also the jugular vein is compressed, the venous blood will be dammed up and escape in greater force through a leak in the sinus.

Concerning *treatment*, we have to divide the cases into two groups: the unoperated and the operated ones. For the former the following means have been tried: injection of cold water into the external ear canal, instillation of perchloride of iron, plugging of the ear, nose, and throat, ligations of the carotid, based on an erroneous diagnosis once. The effect of these modes of treatment are of little, if any, good effect.

In regard to the *non-operated cases* I would resort to the method I described in the epicritical remarks to my case, namely, the exposure of the bleeding spot after previous compression of the peripheric end of the sinus, eventually after ligation of the jugular vein, so as to be able not only to still the bleeding efficiently, but also to treat the primary affection thoroughly. It is recommendable in general to

¹ "Carotisblutungen," *Arch. f. Ohrenheilk.*, xviii., 42.

operate, as the bleeding mostly starts from the lateral sinus, and, in case another sinus is affected, it will be likely to afford an approach to a more direct and efficient tamponade.

For the second group, the operated cases, there has been used: tamponade and digital compression of the bleeding spot, the tamponade of the rhino-pharyngeal cavity, and the tamponade after exposure of the sinus in its peripheral part. In spite of the plugging, hemorrhage repeated itself and did not preclude the fatal issue in the cases of Beck and Ledermann, whereas it had a good result in the cases of Grunert and Grunert and Zeroni. In conclusion I beg leave to recommend again the method by which the case under consideration, desperate as it looked, was brought to a satisfactory termination.

GENERAL SEPSIS IN CHRONIC SUPPURATION OF THE MIDDLE EAR, WITH A CENTRAL PERFORATION OF THE DRUM.

By PROFESSOR BEZOLD, MUNICH.

Translated by Dr. ADOLPH O. PFINGST, Louisville, Ky.

IN a former publication,¹ in which I reported twenty deaths occurring as a result of complications of acute and chronic middle-ear suppuration, I called especial attention to two of the cases where an acute exacerbation had taken place during a chronic otorrhœa, with a central perforation of the drum. In all of the other cases death resulted after cholesteatoma, with or without caries, or caries alone had developed. In the two cited cases none of these conditions was present, so that I feel justified in putting them in a category of their own. I have since then observed another similar case. The three cases were characterized by the development of acute general sepsis when the clinical and anatomical conditions had in no way suggested such a course.

CASE I.—The first case occurred in a girl fifteen years old who had been treated at our clinic two years previously for chronic otorrhœa. At that time the left ear had a perforation in the anterior portion of the drum. The right one could not be seen as the canal was closed by furuncles. When she returned, Jan. 20th, she had been suffering for four days with pain in the left ear. Soon after her admission to the hospital the ear began spontaneously to discharge a tenacious mucus. She had some elevation of temperature at the time and there was considerable mental hebetude. Two days later, an exudate appeared upon the tonsils.

¹ These ARCHIVES, vol. xxvii., p. 309.

On the 23d and 24th, her temperature rose to 40° C., somnolence increased, and she vomited frequently during the day. The skin became hypersensitive and the mastoid painful on pressure. There was incontinence of urine and fæces.

The antrum was opened on the 24th and, with the exception of a small yellowish-white fibrinous deposit on the posterior wall, was normal. Cultures of the streptococcus pyogenes were obtained from the exudate. For several days following the operation the mental condition improved, but no change was noted in the fever, the vomiting, and the hypersensitive condition. The pulse had always been rapid.

On the 28th, delirium set in. There were traces of albumen in the urine, and considerable enlargement of the spleen was made out. On the 29th, the sputum was streaked with blood, and dullness was elicited on percussion over the region of the right scapula. On the 31st, dullness could also be detected on the left side posteriorly, and there was bronchial breathing. Death followed during that night. The temperature remained high up to the time of death.

The autopsy revealed interesting conditions. There was a thrombophlebitis of the left internal jugular vein, fresh emboli of pus in both lungs, fibrinous pleuritis, and some enlargement of the spleen. The post-mortem diagnosis of septicæmia was made. The sigmoid sinus contained liquid blood, but in the bulb of the jugular a peripheric thrombus was found. It extended slightly downward, tapering to a point in the jugular. The wall of the vein was normal and was separated from the clot by a column of blood. The petrosal sinuses were empty. Incision of the bulb from behind and internally showed that the clot was adherent to the vessel wall by a small area. A small projection of the thrombus extended into the emissary vein. The walls of the veins, with the exception of a very small hyperæmic area in the bulb, were normal. The drum membrane was thickened and presented a kidney-shaped perforation in its lower half. The removal of the tegmen showed that the mastoid cells were normal everywhere except in the immediate neighborhood of the antrum, where they were congested. There was a small fibrinous exudate on the posterior wall of the antrum, and a very thin layer of pus on the floor of the aditus ad antrum. The tympanic cavity also appeared normal, with the exception of one small area in the vicinity of the ligamentum malleus superior, which was hyperæmic.

This case presents features of unusual interest. The rapid course, terminating fatally fourteen days after the first pain in the ear, the disparity between the anatomical changes in the middle ear, and the rapidly developing and fatal thrombophlebitis all stamped it as an exceptional case. There can be no doubt, with the history of otorrhœa of long standing and the presence of the kidney-shaped perforation, that the girl was the subject of chronic middle-ear inflammation. We know that such chronic cases, with large perforations, are usually looked upon as harmless, especially where the perforation is near the middle of the drum. With a central perforation, cholesteatoma seldom if ever develops. An anatomical condition which is nearly always present when a chronic middle-ear suppuration has existed for a long time, and which was not present in our case, is the obliteration of the pneumatic cells of the mastoid and the formation of sclerosed bone. In our case normal air cells were found.

Notwithstanding the slight anatomical changes in our case, the patient presented an aspect from the very first that would indicate a serious general disturbance. This was at first attributed to the tonsillar affection, but when this improved and the grave symptoms continued, meningitis was suspected. The involvement of the lungs, by which the embolic process was recognized, did not take place until three days before death. Continued high temperature and the mental disturbance, which lasted throughout the course of the case, were indications of general sepsis.

It was impossible to determine at the autopsy just how the inflammatory process had extended from the middle ear to the bulb of the jugular vein, as the antrum contained only a fibrinous exudate, and the pneumatic cells of the mastoid process were empty though hyperæmic in the immediate vicinity of the antrum.

CASE 2.—A well nourished young man of twenty-three years applied for treatment on June 25, 1896. Five days before his admission, his left ear had pained him considerably and began to discharge fetid pus. He gave a history of recurrent otorrhœa of eight years' duration. When admitted, his left ear-canal was

obstructed by furuncles and was very painful. His temperature at this time was 39.0° to 39.5°C . He seemed drowsy and complained of headache. There was considerable mental hebetude. The left ear was discharging profusely, so that the canal filled up rapidly after mopping. The mastoid was sensitive to pressure. On the following day the temperature rose to 40.1°C ., and as the other symptoms continued it was decided to operate.

The mastoid was hyperæmic and spongy in parts. The antrum was filled with dark red, swollen mucous membrane. Only a very small quantity of pus was noticed, the antrum being almost free of pus. Agar cultures were made from the contents of the antrum and the streptococcus pyogenes developed. On the day after the operation the patient was so restless that he had to be isolated. Temperature 38.5° – 39.6°C .

On the 28th the patient continued delirious. The left pupil was slightly dilated, and the left half of the face was hyperæmic. There was incontinence of urine. Temperature 39.0° – 40.2°C .

On the 29th the patient lost all sensibility. There was a slight convergent strabismus on the left side. The pulse grew gradually weaker, and the temperature dropped from 40.1° to 38.3°C ., and by night the patient died.

At the post-mortem examination the lungs were found congested at their apices. The bronchi were empty but congested. The somewhat enlarged spleen was soft and was easily torn on manipulation. The brain membranes were hyperæmic, the ventricles empty. The dura over the posterior surface of the petrous bone on the left side was somewhat thickened and a thin layer of pus intervened. The other organs were all normal. The post-mortem diagnosis was "otitis media purulenta with pachymeningitis externa purulenta circumscripta. Sepsis."

A more minute examination of the region of the mastoid bone showed that the dura was hyperæmic around the sigmoid sinus, and also over the aditus ad antrum. A thin layer of a translucent exudate was found under the dura at this point partly adherent to the bone. A similar exudate was also found under the dura at a point corresponding to the outer wall of the sinus.

On removing the anterior wall of the ear canal the drum was exposed, and showed a fibrinous bloody exudate about the size of a split pea, adhering to its anterior inferior quadrant. It was easily removed with a cotton mop. Below this deposit there was a well-defined narrow perforation about $1\frac{1}{4}\text{mm}$ long.

The mucous membrane of the antrum and the aditus, which was exposed by lifting the tegmen, was irregularly thickened, boggy, and hyperæmic. It contained minute isolated hemorrhagic areas. In the lower portion of the tympanic cavity the mucous membrane was very much swollen and watery, some of the swollen tissue extending into the Eustachian tube. The rest of the middle ear was normal. In the interior of the lateral sinus, at points corresponding to the fibrinous deposit found under the dura, the sinus wall was reddened and infiltrated with blood. Several minute new coagula were found adherent to the wall. The bulb of the jugular was almost occluded with a fresh, reddish, fibrinous coagulum, which was easily detached from the vessel wall. The jugular was hyperæmic for 2-3cm below the bulb.

All of these changes showed that we had to deal with a case of phlebitis without thrombus formation, in addition to the acute sepsis. In its rapid course and fatal termination, the disproportion between the local changes and the clinical course, and the fresh fibrinous formation in the middle ear and on the drum, this case resembled closely the first case. They differed in that the avenue of extension of the inflammatory process could be recognized in the second case but not in the first one. It was indicated in the second case by the red fibrinous and partly purulent deposit between the bone and dura. The interior, not only of the sinus but also of the bulb and jugular below the bulb, showed evidences of an inflammatory process. The case is a typical illustration of acute sepsis which developed through the sinus.

CASE 3.—A boy of twenty-one, whose left ear had been discharging pus at intervals since childhood, applied for treatment on Feb. 2, 1898. His ear had been discharging for four weeks, but he had suffered no pain until five days ago, when a chill was followed by severe pains in the ear. When admitted to the hospital he was still complaining of severe pain and his mind seemed sluggish. The temperature was 38.8° C., pulse 100. Examination showed a normal drum on the right side while the left had a large perforation at the anterior inferior quadrant. A small bead of tissue was adherent to the posterior border of the perforation; possibly a fibrinous deposit. An odorless muco-pus was

discharging from the opening in the drum. The mastoid process was sensitive to pressure at the posterior inferior border.

Operation.—In making the incision through the soft parts over the mastoid, several dark red glands were cut across. The bone contained only a few cells and they were filled with fibrinous material and pus. The antrum was free of pus, but its lining membrane was hyperæmic. The contents of the mastoid cells were examined microscopically and contained chains of cocci without capsules, evidently the streptococcus pyogenes and small rod-shaped bacteria, resembling the influenza bacillus. (Similar bacteria were also present in the other two cases.)

For two weeks following the operation a slight elevation of temperature persisted. Insomnia, pain, and sensitiveness to pressure also continued for two or three weeks. After that the patient made an uninterrupted recovery, and when he was discharged on the 5th of April the wound had closed. The opening in the drum remained and continued to discharge a scant amount of odorless secretion.

The disproportion between the symptoms and the anatomical changes in the two other cases led to the operation in this case notwithstanding that there was a large central perforation. The subsequent course of the case shows that the operation was justifiable.

Briefly reviewing the three reported cases, it would seem that, from the appearance of the drum and middle ear, the formation of the fibrinous exudate in the ear canal, on the mucous membrane of the middle ear, and on the sinus, the disseminated areas of inflammation, and the severity of the cases, two of which terminated fatally, an infection peculiar to itself had taken place, and that we would be justified in placing these cases in a category of their own. As they can not well be classed with any of the ordinary complications of acute and chronic middle-ear suppurations, I have suggested that they be classed as cases of "acute sepsis in subjects with a large central perforation of the drum."

The cause of these cases is obscure. Their rarity would suggest that some specific cause exists for them. Occurring in healthy individuals, and complicating a form of middle-ear inflammation which experience has taught us to look upon

as harmless, led to the assumption that the infecting element was very virulent, or that it was present in exceptionally large quantity.

The predominating micro-organism in each of the cases was the streptococcus pyogenes. In two of the cases there was, in addition to the middle-ear inflammation, an otitis externa crouposa, and in one of them a furunculosis. One of them was complicated by a follicular tonsillitis. Severe pain in the ear was common to all of them.

A feature of special interest in the last case was the presence of the dark red glands over the mastoid process. This makes it seem that there was a simultaneous infection of the mucous membrane of the middle ear and the lymphatic system.

CHEESY EMPYEMA OF THE NASAL ACCESSORY SINUSES.

By DR. ALFRED STIEDA, KÖNIGSBERG, GERMANY.

Translation by ADOLPH O. PFINGST, M.D., Louisville, Ky.

RHINOLOGISTS have, in the last few years, been describing a new affection of the nose, characterized by the formation of cheesy masses in the passages, under the name of "coryza caseosa." At first the streptothrix alba was believed to be the specific cause of this disease, but now caseous formation is generally looked upon as a condition which can accompany various affections of the nose and especially empyema of the accessory sinuses. In most of the cases recorded only small masses of the cheesy material were observed. In contrast to these I will report three cases in which large masses resembling cholesteatomata were found in the nasal passages.

CASE I.—A boy, previously in good health, gave the history of frequent headache, chills, and fever, followed by swelling of the left upper eyelid, extending over the bridge of the nose to the right eye. The trouble began eight weeks before he presented himself at the clinic. Soon after its beginning, the attending physician had incised the left upper lid, and three weeks later had removed a fragment of bone 2cm long from near the bridge of the nose. Before the operation, the patient had complained of diplopia and of a yellow discharge from the left side of the nose. When seen by me the upper left lid drooped, covering the entire cornea, and two fistulous openings were seen, one in the middle of the upper lid at its base, and the other just

below the inner canthus of the left eye. The left nasal passage was almost obstructed by a mass which projected forward to within 1cm of the external nares and backward to the choana. The mass was attached laterally to the outer wall of the nose.

The patient was operated upon on October 3d by Prof. Eiselsberg. An incision was made along the upper orbital edge to the summit of the nose and extending slightly downward. Just below the root of the nose on its lateral wall a necrosed area was present, which led into a large cavity filled with a mass of foul cheesy material. This was removed and through drainage from the orbit to the nasal fossa established. By November 17th the wound had healed and there was but slight discharge from the nose. The swelling over the left choana was perceptibly smaller. The patient died three years later of pulmonary phthisis.

CASE 2.—A young lady of twenty-two years gave the following history: In March, '97, following severe toothache, the left side of the face suddenly swelled, and after eight days ruptured under the left eye, discharging a large quantity of pus and resulting in reduction of the swelling. Both sides of the nose had been discharging pus since May. In March two small pieces of bone had been removed from the orbital wall, and later several more pieces came away spontaneously. The left nasal fossæ had been obstructed from the beginning of the trouble.

When the patient presented herself at our clinic, October, '97, the root and dorsum of the nose and the neighboring parts of the left eye were swollen, causing bulging and slight divergence of the left eye.

At the inner canthus of the left eye and encroaching on the external wall of the nose was an abscess covering an area as large as a half-dollar. Both lower eyelids were swollen, and the left one presented two fistulous openings from which pus exuded upon pressure over the abscess. The lower edge of the orbit seemed thickened. The canine fossa appeared normal. Both nasal passages were obstructed by growths. They had a grayish-red appearance and bled readily when touched. Pus was exuding from between them. The naso-pharynx was also partially filled with similar polypoid growths.

The patient was operated upon by Professor Eiselsberg on October 13th. An incision was made from the left ala of the nose to the inner canthus and the left ala of the nose turned

up and to the right. The left fossa was found to be filled with a mass of foul, grayish-yellow, soft material, which was readily removed with a dull curette. The left nasal and the lachrymal bones and the nasal process of the superior maxillary bone were partially involved in a necrotic process. All diseased bone was removed. The reddish soft mass found farther back in the nasal fossæ was removed with scissors, exposing a large cavity which extended upward as far as the base of the skull. The cavity was bounded on the right side by the nasal septum, below by the hard palate, and extended laterally into the antrum of Highmore. The cavity was almost completely filled with granulation tissue. This was removed with a curette, the cavity packed with iodoform gauze, and the ala sutured. The curetted material contained an amorphous matter intermingled with staphylococci and almost a pure culture of the bacillus coli communis. There were no teeth or hairs to denote a dermoid cyst. The patient made a good recovery, and a year later the discharge of pus from the nose had entirely ceased. *

CASE 3.—A six-year-old boy gave the history of having had scarlet fever when four years old, during the course of which he temporarily lost his voice and became deaf. He made an apparently complete recovery in fourteen weeks. Some time later the parents of the child noticed a discharge of pus from near the inner canthus on both sides. The summit of the nose became broadened and the eyes apparently moved farther apart. The boy had suffered frequently from headache. In May, '97, when he applied at the clinic for treatment, he presented a broad flat nose, the distance between the inner canthi of the eyes measuring 4.5 cm. About $\frac{1}{2}$ cm from the inner canthus of both sides, a fistulous opening was discharging a thick yellowish-green pus. A discharge of a similar character was coming abundantly from both sides of the nose. The soft parts over the root of the nose were so swollen that the outline of the nose was lost.

The patient was operated upon by Professor Eiselsberg. An elliptical incision was made across the root of the nose and the flap turned down. The nasal bones were severed at the root of the nose and a mass of cheesy material as large as a hen's egg exposed, which occupied the entire upper portion of the nasal fossæ. It had the color and consistence of white clay and a most disagreeable sweetish odor. It was readily removed with a scoop and the remaining fragments curetted. The cavity was

tamponed with gauze, the ends of which were left protruding from the nostrils. The bones were wired and the soft parts sutured.

The removed mass was made up largely of membranous necrotic fragments. Microscopic examination of prepared sections showed that it was made up principally of necrotic tissue, portions of which were infiltrated with lime salts. In parts the tissue appeared to be made up of cross-sections of acini of glands in the beginning of degeneration. This case also made a good recovery, and five years after the operation was still in a good condition.

The pronounced feature common to all of these cases was the extensive formation of foul cheesy material in the nose, which was easily removed with a dull curette. In the first case, there was a history of fever beginning eight weeks before the operation, and which was accompanied by swelling at the root of the nose. There were subsequent spontaneous rupture and the formation of fistulæ, from which several pieces of bone were removed. There was also a purulent discharge from the nose. The second case apparently began, eight months before the operation, with a severe toothache. This was soon followed by swelling of the face and eyelids and subsequent rupture, with the discharge of a large quantity of pus and the establishment of a fistulous canal. Several pieces of necrosed bone were afterwards discharged from the fistula. This case was also characterized by a free discharge of pus from the nose. In the third case, two fistulous tracts developed spontaneously three months after an attack of scarlet fever. The case was not presented for treatment until two years after the beginning of the trouble. None of the cases gave a history of syphilis or tuberculosis. The fistulæ in the first case developed at the base of the upper lid and just below the inner canthus, and were accompanied by swelling in the left side of the nose, extending from near the external meatus backward to the naso-pharynx. In the second, the swelling appeared at the root of the nose and developed into an abscess at the outer side of the root of the nose. Partial necrosis of the bones of the nose had taken place at that point, and the entire lateral wall of the antrum of Highmore

had necrosed. Fistulous openings were found at the inferior edge of the orbit. The implicated side of the nose was occluded by an accumulation of cheesy material. In the third case, the fistulæ had formed at the root of the nose and communicated with the enlarged upper nasal meatus, which was filled with cheesy material.

The nature of the material removed from the first two cases differed somewhat from that in the third case. In the first and second case there was an amorphous material, the second case having in addition a large number of bacteria, among them almost a pure culture of the bacillus coli communis. In the third case, the mass removed from the nose contained connective-tissue cells, many of them broken down and in parts making the impression as though acini of glands had been cut across. Between the cells quantities of calcium salts had been deposited.

In the first of these cases, the history of a sudden onset, with chills and fever, inflammatory swelling, the formation of an abscess, and the desquamation of spiculæ of bone after incision of the abscess, would indicate that the root of the nose was the seat of an osteo-myelitis, although this would not account for the large encapsulated mass of detritus in the nasal fossæ. This seemed rather to come from one of the accessory cavities of the nose, most likely either the ethmoidal cells or from the pneumatic cells of the superior turbinated bone. It had encroached upon the bony wall separating the nose from the orbit and formed an orbital abscess. It had also brought about a distension of the nasal fossæ with considerable stretching of the nasal mucous membrane. The stretched mucous membrane encased the cheesy mass and accounted for the extension of the tumor into the naso-pharynx. The retained mass had probably undergone degeneration, as a result of secondary infection from the mouth and naso-pharynx, and had been transformed into a thick cheesy material. The distension of the ethmoidal cells with pus depends largely upon the resistance of the periosteum. It is distended by pressure, causes absorption of the bony septa between the cells, forming one large sac as it were.

This case could have been mistaken for abscess of the lachrymal sac. However, the lachrymal apparatus was in good condition, and there was no history to indicate an obstructed tear duct. Dermoid, cholesteatoma, and syphilitic affections could also simulate our case, but there were no other features present to indicate any of these conditions.

In the second case, the necrotic process had been so extensive that it would be impossible to form any conclusion as to its primary seat or exact nature. As in the first case, there were swelling, abscess formation, rupture, and the formation of fistulæ. There was also nasal obstruction. In this case, the fistula near the inner canthus also led through the necrosed external wall of the nose into a large cavity filled with a mass resembling a cholesteatoma. The antrum of Highmore, whose median wall was necrosed, contained only granulation tissue. The masses in the nasopharynx and at the base of the skull were most likely adenoid vegetations. The presence of the bacillus coli communis, almost in pure culture, in the necrotic mass was an interesting feature of this case and would indicate infection from the buccal cavity.

Our third case was of especial interest, because the mass found in the abscess cavity contained broken-down tissue cells, some of which were arranged in lamella and in other parts so as to resemble gland ducts. Developing so soon after an attack of scarlet fever, supports the view that the masses were the result of secondary infection. In position, the formation in this case corresponded to the location of the ethmoidal cells, and it is not improbable that the cells, infected from the naso-pharynx, became the seat of the abscess formation.

It is reasonable to believe that the process in the ethmoidal cells was similar to the breaking down of the cell walls and the coalescence of numerous small cells in the formation of one large cavity as we see it in the mastoid bone. The broken-down soft tissue found in our case evidently had its origin in the mucous membrane lining the cells.

The diagnosis of cases like those reported is based upon

the discharge of putrid pus from the nose and the formation of fistulæ externally, especially near the inner canthus. In some of the cases the cheesy masses in the nasal fossæ can be recognized by rhinoscopic examination.

The first object of their treatment should be to incise them from within, through the nose. If this is not possible, external operation will have to be resorted to. With the fistulæ as a guide, the necrosed bone should be removed and the cavity cleansed and well drained.

It might be of interest to cite from literature several of the most typical cases similar to the three reported.

Avellis¹ observed three cases of empyema of the antrum of Highmore in which a fetid cheesy material had formed in the nose. They were all cured by irrigation through the alveolus with a boric-acid solution.

Escat² published one case very similar to these, in which a cure was effected by treatment through the nose.

A case seen by Bride³ developed with symptoms similar to those in one of our cases. The left side of the face and nose swelled, pus discharged from the nose, and the patient suffered with pain in the head. Examination revealed reddish masses in the left nasal fossæ, and their removal exposed a grayish-yellow putrid cheesy mass. This was made up microscopically of broken-down tissue cells, pus corpuscles, and numerous bacteria of different species.

Three cases were recorded by Killian.⁴ In one of these, the antrum of Highmore was filled with a granular white material devoid of all odor. It was made up largely of fatty crystals arranged in bundles. In the other two cases, the material was cheesy and rather tenacious. They were all cured by simple irrigation.

A very interesting case was reported by Bournonville⁵ which began with severe pains in the entire right side of the face, accompanied by lachrymation and obstruction of the right nasal passage. Abscesses developed, which after

¹ Avellis, *Arch. f. Laryngologie u. Rhinologie*, Bd. x., Heft 2.

² *Arch. méd. de Toulon*, No. 4, Feb., 1896.

³ *Intern. Centralblatt f. Laryngologie*, xi., p. 880.

⁴ Heymann's *Handbuch der Laryng. u. Rhinolog.*, iii., p. 1013.

⁵ *Centralblatt f. Chirurgie*, 1885, p. 262.

incision left fistulæ close to the right inner canthus and at the upper and inner border of the left orbit. During the examination of the right side of the nose with a finger inserted in the nostril, the patient, during efforts at retching, discharged through the mouth several masses of a foul grayish material resembling putty. The largest piece was the size of a walnut. The inferior turbinate was almost totally destroyed, and the meatus communicated with the antrum by an opening large enough to admit a finger. The antrum contained similar material to that discharged. After this was all removed by irrigation the right fistula closed spontaneously. The left one, which led to the frontal sinus, did not heal until the fistula was enlarged and the sinus curetted and irrigated.

This case, as well as our cases, gives evidence of the destructive nature of the caseous formation in the sinuses. They also show that the process can be cured by thorough cleansing and drainage.

TWO CASES OF ANEURISM OF THE ARTERIA CAROTIS CEREBRI.

BY DR. A. V. ZUR-MÜHLEN OF RIGA.

Translated by Dr. MILTON J. BALLIN, New York.

A NEURISM of the large cerebral vessels does not seem to be as rare a disease as one would perhaps be inclined to suppose judging from the publications on this subject, the number of which have, however, been increasing during the last few years. They are in fact, according to E. von Hofmann,¹ a rather common occurrence in those individuals who have died suddenly and where an official autopsy was performed. The reason why they are relatively seldom diagnosed is undoubtedly due to the fact that a number of intracranial aneurisms do not give rise to any, or only slight, disturbances during the life of the individual, while in other cases the combination of symptoms is so complex and ambiguous that the thought of an aneurism is not awakened in the mind of the attending physician. Inasmuch as cerebral aneurisms can bring about a change in the organ of hearing to a varying degree, and indeed as these disturbances are sometimes the only symptoms of the disease, it may perhaps not be such a rare occurrence for the otologist to have occasion to treat, amongst his patients, a case of this nature. The two following cases may therefore be of interest.

Mrs. A. H., fifty-seven years of age, came to my office on October 9, 1902, complaining of tinnitus in the right ear, which had existed since the summer. It manifested itself suddenly one

¹ Ueber Aneurysmen der Basilararterien und deren Ruptur als Ursache des plötzlichen Todes. *Wiener klin. Wochenschr.*, 1894, No. 44.

evening and continued unabated, in varying intensity, since that time. The history further showed that on January 5, 1902, the patient slipped on the street and fell heavily upon the right side of her head ; for nearly an hour after the fall she was totally unconscious, and vomited profusely during the entire day. No blood had been discharged from the mouth, nose, or ears after her fall, still her sense of smell was lost on one side, which is now again completely restored. The hearing was not impaired and no other symptoms presented themselves ; no headache, no convulsions, and no disturbances of vision. The woman feels perfectly healthy with the exception of the slight tinnitus. On the whole, she is not troubled much by the ringing in her ears and thinks that it is getting gradually better instead of worse. At the same time, however, she noticed that when gently inclining the head to the right, and pressing upon the side of the neck, the noise became less and could often be entirely suppressed.

The patient has been married forty years and aborted very frequently. Of her two daughters who are still living, the younger, about twenty-five years of age, has been frequently treated for marked symptoms of hereditary syphilis. The examination gave :

Ears : *R.*—The hearing is normal in accordance with her age. Weber, the same on both sides. Rinne +. Tuning-fork tests : normal. *L.*—No pathological condition could be found.

Eyes : Acuity and field of vision normal ; the edges of the disc sharply defined ; venous pulsation normal ; no arterial pulsation ; no pulsation of the eyeball ; no exophthalmus.

Nose and nasopharynx normal. No stasis present in the orbital veins.

The cranial nerves do not show the least pathological change ; there are no motor or sensory disturbances.

Reflexes normal.

Psychic condition normal.

With the stethoscope a loud systolic murmur of uniform intensity could be heard over the entire head ; if the common carotid artery was compressed on the right side, the murmur was decidedly weaker, but did not disappear completely ; it sounded as if it became more distant.

The question is, then, in what part of the carotis cerebialis or its branches is the aneurism located? Unfortunately there are no characteristic symptoms pointing to a local

diagnosis, and the field of conjecture can be limited only by exclusion.

It may be stated at the beginning that, inasmuch as the noise is only diminished on digital compression, and does not disappear entirely, there must be a blood supply from some other source, which can be brought about only by the posterior communicating artery. An aneurism of the carotid artery breaking into the cavernous sinus can therefore be excluded, as there must then have been a rupture, of which, however, there are absolutely no symptoms.

The anterior cerebral and middle cerebral arteries (art. fossæ Sylvii) are therefore the only blood-vessels of the larger branches which are of importance. In the case of an affection of the former vessel, the optic and olfactory nerves may become involved in the process and psychic disturbances are frequently present (Lebert, Oppenheim). Such disturbances were not observed; the patient shows no changes at all in her former psychic condition, so that it is improbable that there is an aneurism of this branch in spite of the fact that there was a temporary involvement of the olfactory nerve. Aneurisms of the middle cerebral artery can run their course without giving rise to any symptoms; still symptoms of irritation and paralysis are often reported. According to Lebert,¹ epileptic attacks in cases of cerebral aneurisms are supposed to be characteristic for the seat of the lesion in the fissure of Sylvius. In the case before us, there were neither epileptic seizures nor psychic disturbances; it must, however, be acknowledged that these may yet present themselves.

It seems therefore most plausible to consider the anosmia, although only of a temporary nature, a symptom, due to the relation between the aneurism and the olfactory bulb, thereby locating the aneurism at the point at which the carotid artery branches off into the anterior and middle cerebral arteries (arteria fossæ Sylvii). Irrespective of the fact that, according to Hofmann, aneurisms are preferably situated at the bifurcations of vessels, the absence of other symptoms would substantiate this opinion.

¹ Ueber die Aneurysmen der Hirnarterien. *Berl. klin. Wochenschr.*, 1866.

An aneurism of the anterior communicating artery hardly comes into question, as a disturbance in the bruit would hardly be expected from compression of the carotid artery.

It may be briefly stated that a systolic murmur can also be produced by pressure of tumors upon blood-vessels. This is not to be thought of in the case before us, as a rapid change for the worse would have been observed in the general condition of the patient owing to the growth of the tumor, and besides there was no evidence of a choked disc.

We should be fully justified in regarding the fall which the patient had in January as the causal factor in producing the aneurism, although six months elapsed between the time of this fall and the appearance of the subjective noises. Nevertheless, as already mentioned above, aneurisms may exist for a variable length of time without giving rise to any symptoms. On the other hand, the possibility cannot be positively excluded that the affection owed its origin to the specific degeneration of the blood-vessels, regardless of the fall. The diagnosis of this case from a practical standpoint is not influenced in any way by this deliberation. The treatment is the same in every case, and must be carried out in such a way that a fatal rupture is prevented by properly regulating the mode of living of the patient. It must be acknowledged that there may be a spontaneous recovery, which seems to be in progress in this case, as the patient says that the tinnitus has become weaker instead of more marked.

During last December, a Miss v. G., aged twenty-four years, was sent to me by Dr. Siegmund, with the diagnosis of "cerebral aneurism." The seat of the aneurism could be determined with certainty by the examination of the eyes (Dr. von Krüdener), and the diagnosis was made of "rupture of an aneurism of the carotid artery into the right cavernous sinus." The auditory disturbances consisted in diminished hearing on the right side, which was associated with a beating and knocking in the right ear and corresponding side of the head. Miss v. G. wrote out the history of her case herself, at my request, and I have given it here unabridged.

When I was two years old I struck my forehead against the sharp edge of a marble table, which left a permanent scar on the right side directly over the eye. Fourteen years ago, being then ten years of age, we spent the summer at Veules not far from Dieppe, where I took cold sea baths; during this summer my headaches began. The attack would commence with a glimmering before my left eye, whereupon the pain set in above my right eye and usually lasted one to two hours. I usually fell asleep and when I awoke the pain had disappeared. In the first few years the pain usually came on once in fourteen days, and as a rule in the morning after awakening. If the headache did not appear in the morning after awakening, I was generally free for that day, and often for the following day also. Later, however, there were weeks and even months during which I had continuous headache, which came on during the day or night. At the same time my head was always glowing hot while my feet were ice-cold. It often appeared to me as though there was a haze before my eyes, even if I had no pains; still, during the time that these headaches were present, this haze was always before my eyes. Shortly after the pains appeared, I began to complain of a general dazed condition, so that I avoided walking, bathing, or riding alone. I could naturally not explain this state of affairs, and must confess I became frightened. This dazed condition never lasted more than half an hour, still it seemed very much longer to me after awakening from this dormant state. Inasmuch as the anæmia was regarded by the physicians as the main cause of my headaches, I was compelled to take a large amount of iron and strengthening medicaments, which naturally had no effect upon my headaches. As menstruation had not yet begun with my seventeenth year, the cause of my ailment was finally attributed to this fact. Still the doctors could not agree on this point, since one thought that my abdomen was undeveloped like a seven-year-old child, while the other affirmed that I was normally developed, but could not, however, explain the cause of my amenorrhea. I was then treated without result for three years, in Nice, by a doctor (not a gynecologist) who administered foot-baths, hypodermic injections, and warm compresses upon the abdomen. Two winters ago my menstruations appeared, which, however, are very scant and quite irregular (every two, three, or four months). Of late I feel, in addition to the headaches (even if not present), a marked buzzing and a dull knocking behind the right ear, which sensations extend

into the region of the neck. When I ascend I experience a marked dyspnœa, and I have the sensation as if I were suffocating. I should still like to mention that after having written about a page, my right arm feels as though it were constricted at the elbow.

In addition to the above statement of the patient, it may only be necessary to add that she had pneumonia in her tenth year, whooping-cough in her twelfth, and measles in her sixteenth year. She is also inclined to give her fall against the edge of the marble table as the cause of her illness. While I could not obtain direct, trustworthy statements from the relatives, the mother states that the affection developed gradually and that she could not name a fixed year in which it began. She remembered only one unusual event. When four years old her daughter fell down unconscious without any apparent cause, and remained so for three hours, having, however, had no convulsions. She thinks that probably this was the beginning of her daughter's illness. The friend and former teacher of the patient, Miss K., declares emphatically that for at least ten years all the present symptoms, especially the exophthalmos and the dilatation of the veins around the eyes, had been well marked. This last statement was corroborated and proved by the ophthalmoscopic conditions which were taken elsewhere on the 29th of April, 1896, and where it was found that the disturbance of vision was almost the same as that reported by Dr. von Krüdener.

The examination revealed :

A delicately built, medium-sized young woman with almost normal bodily development. The mucous membranes are as a whole normal; there is at least no marked anæmia or livid discoloration. The very pronounced bilateral exophthalmos, and the very marked appearance of the veins on both temporal regions, are the remarkable features. The tortuous veins rising above the level of the surrounding parts gradually grow thinner as they run backwards from the outer angles of the eyes, and gradually disappear in the border of the hair line. At the first glance, the dilated

veins at the inner angle of the eye are not so plainly visible. Between the upper and outer border of the orbit and the eyeball, a soft mass sometimes protrudes, which consists evidently of dilated orbital veins.

Upon both sides of the occiput, at the place of exit of the mastoid vein, one is able to feel, by placing the flat hand upon the head, a marked fremitus, which is widely diffused backwards, upwards, and downwards, while the scalp seems softer than when in the normal state. By means of the stethoscope one can hear a loud systolic murmur over the entire head, but more marked on the right side. Upon digital compression of the right common carotid artery, the murmur became somewhat less, but did not cease entirely, while the palpable fremitus at the right side of the occiput became extinct, continuing, however, unchanged on the left side. If the left carotid artery is compressed at the same time, the murmur and fremitus disappear completely. The intensely pulsating carotid arteries are very pronounced on both sides of the neck, but more on the right than on the left. They feel like firm elastic cords upon palpation, but are readily compressible.

The lungs are in a normal condition; the apex of the heart is displaced downwards and outwards; the gastro-intestinal tract and the kidneys are also normal.

Vaginal examination (Dr. von Knorre): No anomaly of the genital organs which could be attributed as the cause for the amenorrhea; this irregular menstruation is no doubt due to the patient's former markedly reduced general condition.

Ophthalmoscopic examination (Dr. von Krüdener): Both eyeballs protrude; the tarso-orbital folds have disappeared; the capillaries of the upper lid are markedly congested, and the frontal and lachrymal veins are very tortuous and dilated. The movements of the eyes are however free and prompt; Graefe's and Stellwag's symptoms are not present. The protruding eyeball can be pushed back into the orbit, but returns to its original position as soon as the pressure is relieved. The finger which is placed upon the eye feels a very weak fremitus, which is also audible by means of the

stethoscope. The functional examination revealed normal vision on both sides and a left homonymous hemianopsia, which, however, was not complete, inasmuch as at the point of fixation the limit of vision extended ten degrees beyond the hemianopic field. Otherwise the hemianopia of each eye is sharply defined. In addition there is a marked hemianopic reaction of the pupils. The optic nerve on the right side is pale in the temporal, while on the left side it shows degeneration in the nasal part. The veins are quite congested, but show no pulsation. The arteries are perhaps somewhat more constricted than under normal conditions. We have therefore a bilateral, pulsating exophthalmos, a left hemianopsia, an atrophy of the corresponding halves of both optic nerves, and a hemianopic reaction of the pupils. If the pulsating exophthalmos and the other symptoms—the fremitus of the right carotid artery and murmur in the head—lead us to the diagnosis of aneurism or rupture of the right carotid into the cavernous sinus, the diagnosis is still further substantiated by the hemianopsia, the corresponding optic atrophy and the reaction of the pupils showing that there must be an interruption in the conduction below that place at which the fibres branch off to the oculomotor nucleus—namely, in the tract itself. The seat of the aneurism or of the rupture of the right carotid artery into the cavernous sinus is therefore at the corresponding optic tract, or the dilatation of the sinus, from the affection in question, has injured the tract to such a degree that its conducting power has been entirely cut off.

Otoscopic examination: The membrana tympani is absolutely normal, showing no retraction or cloudiness. Examination of the nose and naso-pharynx also reveals nothing pathological. In reference to the power of smell, the patient states that she smells everything, although her sense of smell cannot be considered very acute.

Tests of hearing: Whispered speech; vowel u, 1 metre; numbers and words with sibilants, about 2 metres.

Weber, the same on both sides. Rinne positive.

Tuning-fork tests: The lower the tone of the fork, the worse the perception. C is heard only when the fork is

struck very hard, while c^1 is heard somewhat better; when using c^3 a decided improvement in the hearing is observed, and c^4 seems to be perceived equally well on both sides.

This observation could be proved with the piano. The entire scale was tested by means of a pianino provided with an excellent mute; the lower one descended, the worse the hearing. There were no gaps in the scale. The left ear is normal in all respects.

The patient complains of a subjective tinnitus in the right ear and of a severe beating and knocking, which radiate toward the occipital region. These become especially marked and annoying during bodily exertion and excitement.

We must still mention a very slight sensory disturbance, in those parts supplied by the first branch of the right trigeminus.

The affection is of interest for several reasons; in the first place, on account of its long duration, inasmuch as it has with great probability existed since earliest childhood, certainly for ten years at least. Whether there are cases reported in literature which are of similar duration I cannot positively state, as it was impossible for me to go through the entire literature on the subject. No case is reported in Sattler's paper¹ (only goes to 1880), and I could not obtain Keller's article² (goes up to 1898). A rupture of the carotid artery in childhood has been observed. Nissen showed at the twentieth congress of the Deutsche Gesellschaft für Chirurgie, 1891, a boy, four and a half years of age, who presented the typical symptoms of a rupture of the carotid artery into the cavernous sinus, which had been brought about by an injury with a garden rake over the left eye, and who was cured by ligation of the carotid artery.

Hofmann found that up to the fifteenth year of age the percentage of aneurisms of the arteries at the base of the brain was 1.8%. According to him, the predisposing cause lay in the thinness of the walls of those vessels and in the

¹ Sattler, "Pulsirenden Exophthalmos und Basedow'sche Krankheit," *Graef-Saemisch. Handbuch der Augenheilkunde*, 1880.

² Keller, *Bidrag til leeren om der pulsirenden Exophthalmos*. Kopenhagen, 1898.

under development of the muscular and elastic elements, which facts are especially favorable in bringing about ectases.

Aside from injury to the head associated with fracture of the base of the skull, in which the carotid artery can be lacerated or severed by sharp spicules of bone, Sattler shows the possibility that this vessel can be slightly damaged without a disturbance in the continuity of the bone, merely by severe concussion alone; and that at first there is only a tear in the inner layers, which develops into a complete rupture. At all events, Sattler assumes that advanced age or a predisposition to a diseased condition of the arteries is an important factor in producing this affection. Although this latter condition is not present in our case, still I do not wish to leave it pass unmentioned, as other symptoms of fracture at the base of the skull are also lacking.

Analogous cases have been reported, showing the slow and latent development of the specific symptoms of rupture. Morton (cited by Sattler) reported a patient in whom, about one year after trauma, a swelling appeared above the eye, which was easily compressible and which grew slowly in the following two years, but increased rapidly in size in the third year. In another case (Hart, seven-year-old boy, cited by Sattler, p. 798), a protrusion of the eye did not become noticeable until four years after the injury; headaches and a buzzing in the head had existed a long time previous.

It may therefore be assumed that the case before us is taking a similar course, and that all the more because other etiological factors do not point towards any other special direction. The formation of an aneurism is also observed in young individuals in consequence of parasitic and embolic processes (Pel)¹ following infectious diseases; still the patient states that she never was sick before the appearance of her headaches and disturbances of vision in her tenth year, which nevertheless point towards the aneurism. She had her pneumonia about nine months later (in the spring of 1889). The displacement of the apex of her heart downwards

¹ Pel, "Zur Kenntniss der embolischen Aneurysmata." *Zeitschr. f. klin. Med.*, xii., 1887.

and outwards can be regarded only as a sign of a muscular hypertrophy in consequence of increased activity, while the slight systolic murmur is of a congenital nature. It cannot be determined with certainty what connection there exists between the fall which the patient had in her fourth year, and which was associated with unconsciousness for three hours, and the present affection. It must, however, be acknowledged that there is a possibility that this fall signalized the time of rupture, and that all other symptoms only developed much later.

The case before us is furthermore interesting on account of a bilateral development of all the symptoms. Sattler found only four cases up to 1880. Several were reported later on¹; they are nevertheless very rare; although in elderly persons certain anatomical changes (see Sattler, p. 907) can be regarded as the cause of this affection, there is hardly anything of this nature to be assumed in this case. That the petrosal sinuses are not too narrow is shown by the marked development and the palpable fremitus of the external veins of the occiput. It is more probable that during the development of the child's skull all the venous channels had become dilated, especially also the circular sinus, through which a free communication had been established with the veins of the other side.

In consequence of this dilatation of the venous channels, there was, on the whole, no increase in intracranial pressure. It is natural that the disturbed circulation, the marked fremitus of the venous blood, and the pulsation caused subjective sensations, still compensation was well established. However, the affection approached very closely to a pathological condition, and the increased heart action, which was brought on by psychical exertion, was sufficient to produce symptoms of cerebral pressure in the form of an obstructed circulation (dysdiamorrhysis of Kocher), in addition to symptoms of meningeal irritation: headache, pain in the limbs, restlessness, tinnitus, general excitement, disturbances of the mind, etc. The horizontal position seemed to have

¹ Reif, "Ein Fall von doppelseitigem pulsirenden Exophthalmos." *Beitr. z. Augenheilk.*, 1899.

some effect, for when the patient lay down she immediately fell asleep, and often, as those around her thought, with open eyes. Her sleep was unusually sound and deep, and she had in addition a certain inclination to sleep a great deal.

The disturbances of hearing, which were in the form of subjective sensations of sound, were due partly to the direct transmission of the whirl and rushing noises to the ear, partly to their cerebral nature owing to a disturbed nutrition or cerebral pressure, and finally to a reflex action brought about by the irritation of other nerves (trigeminus, facial). As would be expected, these phenomena disappeared after ligation of the common carotid artery.

The hardness of hearing can hardly be attributed to a lesion of the internal ear in consequence of a hemorrhage following the injury, but probably to the venous hyperæmia of the internal ear. Inasmuch as the hardness of hearing has lasted so many years, anatomical changes in the form of connective-tissue hypertrophies have no doubt also developed, which can no longer recede. A complete restoration of the hearing was therefore no longer expected and did not, in fact, take place. As recommended by many (Sattler, l. c., Siegrist)¹ I first had methodic compression of the carotid carried out (4 to 5 times daily for 5 minutes for a period of 16 days), before resorting to operative measures. This manipulation is by no means to be undervalued as a preliminary procedure. The collateral circulation in the brain is readily adjusted and it becomes possible by this means to avoid unpleasant and unexpected accidents, which could arise in consequence of the sudden cerebral anæmia. The patient stood the compression well, but only at the beginning there was slight dizziness associated with a benumbing and paræsthesia (fornication) of the hands and arms; these however all disappeared later. A deep and slower respiration was sometimes noticed, a sign of increased cerebral pressure, showing that the veins were compressed simultaneously with the arteries.

¹ Die Gefahren der Ligatur der grossen Halsgefässe für das Auge und das Leben der Menschen. *Arch. f. Ophthalmologie*, vol. 1., 1900.

Operation performed January 6, 1903.

Under local anæsthesia, I exposed the common carotid artery and tied it at the typical place (superior carotid triangle). As I was tying the ligature, the patient uttered several times "My heart, my heart," and then became quiet again. The operation was finished without any mishaps. An examination of the fundus of the eye, taken during the time of ligation, revealed nothing positive.

The healing took a normal course, with the exception of occasional severe headaches and restlessness, which were mainly caused by the patient lying quietly upon her back. At the end of a week I removed the first sutures, and five days later the last sutures.

The result of the ligation was already noticeable on the following day. The right eye receded considerably and the marked venous congestion in the temporal region appeared almost normal. The fremitus which was palpable in the right occipital region disappeared completely, while it still persisted on the left side, although decidedly reduced. The murmur which was audible over the entire head by means of the stethoscope was still perceptible, but to a less degree. The left eye also gradually receded, so that there is only a very slight exophthalmos at the present time.

The general improvement was marked. The severe headaches disappeared entirely; they came on for the last time on January 17th, and have not reappeared. The patient feels decidedly better. The beating in the head, which was formerly so severe and annoying, often remains away for a longer or shorter interval, but when it does come on it is much weaker than heretofore. The head feels free, and a dazed condition of the mind did not present itself. The sleep is no longer as sound as formerly and has a more normal character. In addition, the patient does not fall asleep immediately as formerly, but lies awake for some time in her bed. She is also awakened during the night by noises, which was formerly not the case. She has regained her bodily weight to a marked degree and her menstruations have appeared regularly and twice since the operation.

I did not perform double ligation and section of the

carotid, as is sometimes practised in recent times in order to prevent a relapse. I am convinced that if the ligature is tied firmly enough the lumen of the canal will not be re-established. The operation of double ligation is no more difficult, and it depends more or less upon the choice of the operator which method he will select. It is of great practical importance to know whether the unilateral ligation will bring about relief for a sufficient length of time, or not. For the time being it answers the purpose, although it does not completely alleviate all the symptoms. The patient is therefore prepared and willing to allow the ligation of the other carotid at some future time in case of need.

The hearing is also somewhat improved, as was shown by an examination undertaken about two months after the operation; this may have been brought about by the disappearance or the diminution of the subjective noises, or by the removal of the cerebral congestion. The tuning-fork tests showed a decidedly better perception for deep tones, which was substantiated by means of the piano, while whispered speech was heard from four to five metres.

ON THE PATHOLOGICAL ANATOMY OF DEAF-MUTISM.¹

By DR. SCHWABACH, BERLIN.

Translated by Dr. ARNOLD KNAPP, New York.

THE specimens which I am about to show you belonged to a deaf-mute, thirty-five years of age, who died on February 4, 1896, of acute miliary tuberculosis. Owing to the poor condition of the patient, an examination of the ears could not be undertaken, and no examination of the hearing was made. It was not possible to determine whether there was any cause, either congenital or acquired, for the deaf-mutism.

I obtained possession of the right temporal bone for microscopic examination. It was hardened in Mueller's fluid, decalcified in 10 % nitric acid, hardened again in alcohol, imbedded in celloidin, and cut in serial sections at right angles to the long axis of the petrous bone. The sections were stained with hematoxylin-eosin and with the Weigert stain for medullated nerve fibres.

The mucous membrane in the bony Eustachian tube was very much thickened and infiltrated with small round cells in the superficial parts and in the deeper parts in the neighborhood of the tympanum. In a number of places there were many round miliary tubercles with giant cells with but little caseation. The infiltrated mucous membrane in other regions presented giant cells without miliary formation. The epithelium was well preserved, and, in the anterior parts of the tympanum and on the labyrinth wall, was thickened and infiltrated. Here, also,

¹ Read, with demonstrations, at a meeting of the Berlin Otological Society, November 12, 1901.

isolated miliary tubercles with giant cells were found present in the mucous membrane. Tubercle bacilli, however, were not recognized in any of the sections.

Giant cells were found in the tympanic cells situated in the floor of the tympanum, where the mucous lining was found very much thickened. Partly caseated miliary tubercles with giant cells were also present in the thickened mucous membrane of the attic, and in the posterior pocket of Troeltsch, especially numerous in the niches of the oval and round windows. The niches contained connective-tissue strands. The mucous membrane on the promontory was thickened and infiltrated, numerous small mucous crypts were present, with well preserved epithelium. The mucous layer of the drum membrane seemed to be least changed. The drum membrane showed a large defect in its lower half. The cuticular layer of the drum was thickened and infiltrated. The epidermis continued along the margin of the perforation to the inner surface of the drum, traversing for a short space the mucous membrane. The mucous membrane covering the hammer and anvil was thickened and infiltrated with a number of isolated giant cells. The bone was superficially eroded in several places, as well on the hammer and incus as in the floor of the tympanum. The anvil presented a large defect. The lower part of the body and the upper part of the long process were missing. The branches of the stapes were embedded in thickened mucous membrane. The stapes foot-plate was unchanged, the annular ligament and the stapedio-vestibular articulation were normal.

At the beginning of the cochlea in the scala tympani there were three areas of new-formed bone, of which one passed directly upwards into the lamina spiralis ossea, extending inferiorly into the membrana tympani secundaria. Another and a smaller area was directly adjacent to this latter membrane, and the third, the one situated most laterally, passed directly into the spiral ligament of the scala tympani. The remaining free space of the scala tympani is filled with new-formed connective tissue. At the upper wall of the scala vestibuli, passing into the endostium, there was a bony area continuous inferiorly with new-formed connective tissue, which occupied the entire remaining open space. Another bony area was situated more medially above the upper surface of the lamina spiralis ossea. A space irregularly shaped, contiguous to the outer wall of the cisterna perilymphatica, was free from new-formed connective tissue. The spiral ligament

is thickened, infiltrated, and directly continuous with the above described new-formed connective tissue. The lamina spiralis ossea is everywhere distinctly to be seen. There are no nerve fibres between its two lamellæ. The lamina spiralis membranacea is absent. Reissner's and Corti's membranes, as well as Corti's organ, cannot be recognized. More anteriorly the new formation of bone extends into the scala vestibuli, as well as into the scala tympani, especially in the latter, though there are places which are not ossified, and are filled in with new-formed connective tissue. The lamina spiralis ossea is present in the form of a broad, dark strand. Its two lamellæ are converted into a single thick osseous band. The bone formation is so marked as to occupy the entire cochlear cavity. The separation into the scala tympani and scala vestibuli is impossible, as the lamina spiralis ossea is everywhere present. Other parts of the cochlea are not to be recognized. The limitation by the labyrinth capsule is seen from the presence of the new-formed bone, as the new-formed bone does not show the laminated structure more or less characteristic of the labyrinth capsule, but contains a number of cavities filled with delicate connective tissue.

The canalis ganglionaris of Rosenthal is present, though smaller than normal, and contains, in addition to new-formed connective tissue, a moderate number of ganglion cells, usually with indistinct nuclei, which are occasionally absent.

Farther, in an upward direction, the bone formation again diminishes, beginning in the scala tympani and continuing in the scala vestibuli. The lamina spiralis ossea again shows its two lamellæ, though nothing can be seen of the other parts of the membranous cochlea. In the beginning of the middle turn, traces of bone and connective-tissue new formation, are present in both scalas. The spiral ligament shows no pathological change. The lamina spiralis membranacea and the crista spiralis are very indistinct. Corti's membrane and Corti's organ are indistinct, while Reissner's membrane is present. The latter membrane presents a convexity toward the modiolus, so that the cochlear duct is not triangular, as usual, but rounded and dilated.

In the upper part of the middle turn and in the apical turn there is no connective tissue or bone formation. Corti's organ is present, though only in the form of an undifferentiated accumulation of cells (post-mortal change). The canalis ganglionaris is of normal size in this part, though it contains only a few ganglion

cells. The space is not filled with new-formed connective tissue, but appears empty.

Nothing was seen of the *acquæductus cochleæ*. Whether this was missing owing to obliteration by bone formation in its lumen, or whether it was not found because the sections in which it was present were lost, cannot be stated with certainty. The *acquæductus vestibuli* is clearly to be seen, and shows no change. The other parts of the vestibulum and the semicircular canals show no anomalies, especially no formation of new connective tissue or of bone. Of the membranous parts of the vestibule, the *macula acoustica sacculi* was somewhat, while the *macula acoustica utriculi* was perfectly, preserved. The membranous semicircular canals were also normal. The *ampulla externa* is the only one of the *cristæ acusticæ* to be recognizable. The cochlear part of the auditory nerve in its course along the internal auditory meatus showed a number of well preserved nerve fibres, in between which, especially in the region of the entrance into the meatus, there were a number of more or less broad areas which appear to be degenerated nerve fibres, according to the Weigert stain. In the nerve canals of the *modiolus* there were degenerated as well as preserved nerve fibres. The nerve fibres between the two *lamellæ* of the *lamina spiralis ossea* in the lower turn were either entirely absent or were very scant in the bony parts. They again reappear in the region of the middle and upper turns.

The vestibular branch presented fewer degenerated and in general well preserved nerve-fibres. The ganglion cells of the *intumescentia ganglioformis Scarpæ* appeared only slightly diminished in numbers, and were separated in places from one another by large connective-tissue fibres. In the terminal distributions of the vestibular branch there were no pathological changes to be seen.

The facial nerve, the acoustic trunks and nuclei, were also found completely normal.

The main changes found in this specimen, aside from the changes in the middle ear, were contained in the basal turn of the cochlea, namely, the bone and connective-tissue formation in this region. The greatest extent of the changes occurred in the middle part of the basal turn, where they obliterated the cavity, the peri- as well as the endo-lymphatic spaces, so that nothing was to be seen of the membranous

structures. The posterior part corresponding to the region of the round window was less affected as far as ossification was concerned. The open spaces were filled with new-formed connective tissue.

Towards the anterior parts of the basal turn, the bony as well as the connective-tissue new formations diminished gradually, and were completely absent in the upper turn. Consequently in the latter parts the membranous structures were all well preserved, though Corti's organ was somewhat imperfectly present, so that it cannot be said with certainty whether this is due to a pathological change or to a post-mortal degeneration.

In regard to the changes in the auditory nerve and its terminal branches, we find these to be most marked in the parts corresponding to the basal turn, while they are diminutive or entirely absent in the region of the middle and superior turns. In the vestibule and the semicircular canals, the bony parts show no change, and the changes to be found in the membranous parts can either be regarded as pathological or post-mortal. The vestibular branch presented a slight degeneration of the nerve-fibres.

Nowhere was there anything to be seen of the aquæductus cochleæ. It is uncertain whether this canal was actually absent or completely obliterated by new-formed bony tissue, though it is possible that something would have been recognized of this aqueduct in a few other sections which were inadvertently lost. Mygind, in his well-known paper on Deaf-mutism, states that very few autopsy reports mention pathological changes in the aquæductus cochleæ, though unquestionably in a number of cases the aqueduct was closed by bony tissue when the cochlea was filled in with new-formed bone. In my specimens the pathological changes in the cochlea were found most marked in the beginning of the basal turn, just where the aqueduct leads off, and it seems probable that the inflammatory process, the otitis interna, which terminated with a formation of connective tissue and bone, first began in this part of the cochlea. It can further be assumed that the beginning of this otitis interna was an inflammation which extended along the

aquæductus cochleæ from the meningitis to the cochlea, a process which has frequently been observed in the course of cerebro-spinal meningitis. It is not impossible that such an otitis interna may have existed during foetal life. The view of Voltolini that the pathological changes are due to a primary otitis interna cannot be denied in our case, though the anatomical condition found present does not directly speak for it. In our case the absence of pathological changes, especially of bone formation in other spaces of the bony labyrinth, as has been found in the previously published reports of Politzer and Gradenigo, are if anything against the assumption of a primary internal otitis.

The possibility of an extension of an inflammatory process from the tympanum to the labyrinth by way of the round window is not probable, owing to the absence of all pathological changes in the region of the oval window and in the vestibule. The changes found in the mucous membrane of the two niches of the windows were unquestionably due to the tubercular affection of the tympanic mucous membrane; a process which was of recent date from the absence of ulcerative processes and extended necroses. The only large defect occurring on the body and on the process of the anvil was probably due to the old middle-ear suppuration. This same process was responsible for the partial defect of the drum as well as the epidermization of the mucous membrane surrounding the perforation of the drum. It is quite possible that the meningitis which was supposed to have produced the labyrinthitis was also the cause of this purulent otitis, a condition which has been previously described.

The all-important process for the deaf-mutism in our case appears to be the new-formation of bone in the lower turn of the cochlea, and the loss of the nervous elements of the same, a condition which has been previously described by Politzer, Gradenigo, and Steinbruegge. It is striking that in most of the cases described as well as in mine, the chief situation of the disease was the lowest turn of the cochlea. According to Steinbruegge, in the cases in which the morbid agent extends from the internal meatus or along the aquæductus cochleæ, into the cochlea, this condition means the

gradual extension of the toxic agents along the nerves of the modiolus, or along the endostium of the perilymphatic spaces. It might seem possible that the activity of the morbid process should occasionally exhaust itself in its journey to the apex of the cochlea. This also explains that the structures of the endolymphatic spaces occasionally appear to be well preserved for a considerable length of time. In a very marked case a rapid transportation of the poison must take place in all of the labyrinth spaces.

Finally a word as to the changes found in the middle ear. We have two distinct processes: one, the remains of an old purulent otitis, and, on the other hand, a recent process, a fresh tuberculosis of the tympanic mucous membrane. From the above description it will be seen that the tuberculous process invaded the superficial layers of the mucous membrane, the miliary tubercles showed but little caseation, and the ulceration on the surface of the bone was present only in the form of slight erosions. All of this points to the conclusion that we have to deal with a recent tuberculosis beginning in the last days of the patient, in connection with the general miliary tuberculosis found at autopsy.

RECENT THEORIES ON SOUND CONDUCTION.

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Translated from the German Edition, XLI., 1902,

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OF late the ancient and revered theory of Helmholtz has been questioned in many quarters. The criticisms, however, were either unnoticed or silenced without careful consideration, while some authors made elaborate investigations to sustain the old theory, or to establish it in a new form. The difficulty was that certain pathological changes of the ear could not be explained by Helmholtz's theory of the function of the drum membrane and ossicular chain. Many cases have been observed in which serious interference with the mobility of the sound-conducting apparatus could be expected, but where hearing was but slightly or not at all affected. Excellent hearing may exist in cases of extreme opacity and calcification or retraction and flattening of the drum membrane, and what is still more important, good hearing occurs in some cases of total loss of the drum membrane together with the ossicles. Furthermore, the theory does not explain how bone-conduction is lengthened for low forks in interference with the ossicular chain, or in its absence. Thus it is apparent that the doubt of these authors is not wholly unfounded, and it will be worth while for us to investigate their views and reasons.

Long ago the physiological functions of the auricle were denied in man, but in animals its function was evident, for its mobility served to determine the direction of sound. Experience teaches that there is no difficulty in hearing after

the auricle has been lost through frostbite or other accident. Some authors are of the opinion that sound vibrations are caught and reflected into the ear by the auricle, or, at least, a part of the waves, while the rest go direct to the drum membrane. Schneider early demonstrated that filling the concha with wax caused a reduction of hearing. Politzer (1) observed that dulness of hearing resulted when he covered the concha with a piece of stiff paper. On the other hand, the concha alone and not the other depressions of the auricle are of importance in sound conduction. Politzer also mentions the well-known fact that in hardness of hearing, and even in normal hearing, pressing the auricle forward and increasing its surface with the hand caused an improvement in hearing. Furthermore, Politzer ascribes an importance to the tragus in reflecting the sound waves, because the sound waves reflected from the concha are prevented from escaping, and are directed into the meatus by this valve-like projection. From the tragus the sound waves pass to the depression which lies immediately inside the entrance of the canal, and from there to the anterior lower meatal wall, whence they reach the obliquely-placed drum membrane. Owing to these reflections the sound waves should lose intensity, and it appears this is the fact. Zimmermann (2) found that a smooth cylindrical tube could intensify sound, but that the auditory canal, which was irregular in all dimensions, could not. The auditory canal serves also to warm the air and to protect the organ of hearing. He further believes that sound waves suffer a loss in intensity not only in the auditory meatus, but in passing the drum membrane and ossicles before they enter the cochlea.

Before entering more into this author's theory, I propose to draw attention to several of the fundamental experiments and tests of Helmholtz and of other investigators which serve as proof for the aforementioned theory. Helmholtz (3), after study of the mechanism of the ossicles, came to the conclusion that the transmission of sound through the drum membrane and the chain of ossicles took place by progressive waves. In particular, he found the ossicles and the attachments of the malleus and the incus very well suited for a

quick transmission of sound waves. Johannes Müller believed that the chain of ossicles vibrated more like a columella or a stiff rod, or indeed, like a great molecule. Helmholtz has pointed out that the movements of the separate ossicles, produced by air pressure or by sound, could be registered by sensitive recording specimens. Politzer (4) had previously performed the same experiments and had come to the same conclusions. The excursions of the stapes in specimens appeared to be not more than 0.1 *mm*. Helmholtz showed that the foot-plate moved like a lever on account of its peculiar attachment in the fenestra ovalis, and at the same time like a piston. Lucae (5) observed the vibrations of the drum membrane and ossicles and their excursions during bone conduction when the base of the tuning-fork was fastened in the opened mastoid process. The labyrinthine fluid is supposed to be set in motion by the piston-like movements of the stapes, and through the difference of their amplitudes different-sized waves are produced, which set the fibres of the basilar membrane in motion. Moreover, Helmholtz attributed a sound-intensifying action to the drum membrane because of its curved fibres and its umbilicated centre. He supposed the drum membrane and the auditory meatus to act as a resonator. This was supported by an experiment in which he used a glass cylinder with an opening covered with membrane and a small rod, giving it the form of a drum membrane. The little rod was in contact with a violin string, which was fastened to a wooden bridge. On touching the string with a bow the membrane sounded loud. This extended over most of the scale, especially the high notes. Helmholtz, therefore, attributed the special function to the drum membrane and the chain of ossicles of conducting sound waves to the labyrinth.

These functions of the drum membrane and ossicles have been doubted by a number of observers in recent times. Beckmann was one of the first among these, and questioned whether the fibres of the membrane of Corti could be excited by the impact of the stapes. The impact of the stapes on the scala vestibuli produces a progressive depression of the membrane of Reissner. These depressions

act on Corti's arches before they touch the basilar membrane. This could only have a dampening effect. Beckmann (6) showed further that the drum membrane was weighted far too heavily by the ossicles, especially in pathological conditions, to conduct the most delicate waves. Schmiedekam demonstrated that the drum membrane could not respond to a tone of over four hundred and eighty vibrations; and Blake, in experiments with sound complications, found that the drum membrane does not respond and consonants were not to be recognized in the curves. All authors are agreed, including Bezold (7), that for high tones conduction through the ossicles is of little importance. The conduction through the drum membrane and the chain of ossicles is still accepted for low notes. Beckmann thinks no such duality in the mode of conduction possible, and cites as proof of his opinion, the improved bone-conduction of low tones when the drum membrane and ossicles have been lost. He hopes to prove thereby that the conducting apparatus in the case of high tones is superfluous, and that the vibration of the so-called sound-conducting apparatus does not give the impression of sound. Beckmann sees only a dampening apparatus in the drum membrane and ossicles, for the movements of the very unstable labyrinthine fluid. Its equilibrium is preserved through both the fenestral membranes; in the case of the membrane of the round window by its elasticity, and in the oval window by the adjustment of the complicated governor composed of the drum membrane and ossicles. The regulating is aided by the muscles. Beckmann does not accept the possibility of sound conduction through the round window. By fixation or absence of this regulating apparatus a sympathetic vibration of the deeper strings of the basilar membrane would be impossible, because they require the balance of labyrinthine fluid on account of their great amplitude. The better hearing through the bone is owing to the stronger impact which it gives to the labyrinthine fluid. He believes that improvement in hearing with an artificial drum membrane is due to a weighting of the stapes. We will see that this explanation is not always admissible, as it is enough if the cotton pellet lies on the

promontory, where it can exercise no impeding function, but perhaps dampening the intensity of the sound.

According to the researches of Beckmann, a further explanation is given by the dulness of hearing in patients with sclerosis. Through fixation of the stapes or of the whole chain, the dampening is lost and the undamped strings cannot perceive the separate notes; therefore, conversation with many people at the same time is especially difficult. The paracusis of Willis in this form of deafness is explained by the concussion of the body during a journey, or by the effect of loud noise on the labyrinth, which causes the sensibility of the labyrinthine fluid to be in some degree re-established. As a convincing proof of his theory, Beckmann cites the condition of the sound-conducting apparatus in many cases of acute unperforating otitis media. The drum membrane and malleus are fixed in the exudate. The stapes is not fixed but only weighted so that air-conduction is only slightly diminished while the bone-conduction is lengthened.

Besides Beckmann's there are several small papers by Zimmermann, which are collected and enlarged in a monograph on *Die Mechanik des Hörens und ihre Störungen*. Zimmermann's fundamental idea is the same as Beckmann's in respect to the drum membrane and chain of ossicles acting as dampers, but not for the usual sound conduction but for that of unusual intensity. He assumes direct sound conduction through the promontory wall for all tones, because bone is the best conductor. The equilibration of the labyrinthine fluid is maintained normal only through the round window, which, on account of its structure, can only be displaced outward. He considers conduction of sound waves through the window as ruled out, because it is so completely hidden in the niche of the round window. Favorable to this view are cases of fixation of the stapes in which the hearing was still present and at autopsy the membrane of the round window was found mobile. Every sound wave which enters the labyrinth from the bone goes transversely through its contents and all the fibres which lie in its way, but only sets vibrating those which are equivalent to the vibrations contained in the body of the sound. Every

impact from the chain of ossicles on the labyrinthine fluid causes a diminution of sound. One of Gellé's experiments is quoted in proof of this. On fastening the end of a tube connected with a rubber bag in the external meatus and setting the base of a low-toned tuning-fork on the air-bag, one hears the fork clearly; but on pressing the air in the bag with the base of the fork, the sound is diminished. This Zimmermann explains, by inward displacement of the foot-plate of the stapes. In this way restriction of the vibration of the basilar membrane is brought about, particularly for the low tones with their great amplitude. The theory of Johannes Müller, in contradiction, explains the dampening of the low tones by the extension of the fibres of the drum membrane. According to this author, the acoustic result of tightening the fibres of the drum-membrane must, according to mechanical principles, be that this membrane vibrates less and especially the response to slow vibrations must be interfered with.

Zimmermann did not think that the experiments of Helmholtz and Politzer, in which they tested the movements of the separate ossicles for sympathetic vibrations with the note of an organ pipe, were conclusive, as the sounding body was attached hermetically to the auditory meatus, and it was only the increased pressure of air that affected the ossicles and drum membrane.

He denies, on physiological and physical grounds, the capacity of the drum membrane and auricles to react to sound of great amplitude of vibration. The amplitude of most tones is so small that there is only a molecular vibration of the drum membrane possible. The chain, with its relaxed capsular ligaments and numerous attachments, requires a relatively large amount of molecular wave-lengths to overcome the resistance of the ligaments and to make tense the joints. The size of the wave-length has nothing to do with the intensity of the impulse, which every molecule produces, and the wave-length is only the expression for the space of time in which all molecules have completed their vibrations in a wave. The amount of amplitude cannot be determined from the wave-length. It is caused to a greater

degree by the intensity of the sound. It can decrease to nothing on greater distance from the sounding body. It depends, also, very much on the nature of the medium. Incorrectly the high tones are regarded as more intense than the low. In reality this is not the case, for the amplitude depends on the nature of the vibrating body and on the amount of the initial force. Hence these tones are heard at a greater distance than high tones, as shown in the approach of martial music. The vital force is greater with the low tones than with the high because of the greater mass, or, as in organ tones, because of the greater volume. Nevertheless, according to the experiments of different physicists,—Töpler, Boltzmann, Rayleigh,—the amplitude of vibration of sound reaching the ear from a greater distance is at the ear very small. The amplitude, according to accurate measurements, was from 0.0004 to less than 1 millionth *mm*. As the meatus exercises a weakening influence on these tones, Zimmermann considers any movement except of the drum-head and ossicles to be impossible.

The sympathetic vibration of the drum membrane, acting as a resounder for all tones, as shown by Helmholtz in his experiments with membranes, is impossible, according to Zimmermann. These vibrate strongly only with their fundamental tones. This is f_1 for the drum membrane. It vibrates more feebly with overtones. Incidentally the drum membrane may have different fundamental notes in varying tension during various time-units, but not simultaneously for separate tones. "Thousands of drum membranes would be necessary if they act as resonators." Moreover, the auxiliary muscles must be in constant activity to move the drum membrane and the chain of ossicles without interruption as, day and night, sounds beat on our ears. Furthermore, progressive waves cannot undergo change in a transverse direction.

Zimmermann tries to explain with his theory of exclusive bone-conduction the following unexplained phenomena: lengthening of bone-conduction in absence of drum membrane, the working of an artificial drum, and the paracusis of Willis. The still accepted theory of Mach, elaborated

by Lucae, Politzer, and especially by Bezold, assumed that in obstruction of the sound-conducting apparatus the sound waves set the labyrinth and also the sound-conducting apparatus in motion directly, and that the summation of these movements causes a lengthening of the sound perception. This opinion has been refuted by the cases where the sound-conducting apparatus is fixed or absent. Zimmermann draws attention to the fact that Rinne's test, as usually applied to determine the proportion between the duration of bone-conduction with air-conduction, is reversed. In the test of hearing by air-conduction, the longitudinal vibrations of the tuning-fork are used, but when the base of the fork is put on the bone the transverse vibrations take effect. These two sets of figures, therefore, should not be compared. The transverse vibrations pass through the bone direct to the labyrinth by the shortest route, because of the good conducting power of bone, whereas the longitudinal vibrations pass first through the auditory canal of the sound-conducting apparatus. This conduction is not superior to bone-conduction, as Bezold thinks, but is inferior on account of the obstruction in this route.

Zimmermann explains lengthened bone-conduction by assuming the cochlear fibres vibrate in broader amplitudes in absence of the dampening apparatus, resulting, together with the associated auditory nerve fibres, in a condition of increased pathological irritability. Therefore, the patient deludes himself in the duration of his sensations, and thinks the tuning-fork still audible when it has already ceased sounding. Lengthening of duration of true bone-conduction is physically impossible. Zimmermann attempts to explain subjective noises with the same reasoning. These, he thinks, are caused by the sound, mostly of low notes, which interruptedly enter our ears. The roaring of the wind, the rumbling of carts, the street clatter, are chiefly associated with low-pitched noises. The ear, without power of accommodation, cannot dampen the low notes, and the sound waves flow in and result in a tumult. The tinnitus heard in the quiet, as through the night, is like after-images of the eye, and is due to the sensitive fibres remaining in a state of

excitement. The noises excited by foreign bodies in the canal, such as cerumen, are due to the exclusion of the air column. The air remaining in the meatus undergoes an objective strengthening of its vibrations.

The paracusis of Willis is explained by the shaking in the railway which loosens the foot-plates of the stapes so that the muscular contraction can act again. Furthermore, he thinks that the artificial drum membrane acts mechanically. The improvement in hearing when the pledget rests on the stapes is caused by pressure. The constantly vibrating fibres are able to recover themselves, and the stapedius if it were present could resume action. The stapedius being absent and only the stapes or its foot-plate remaining, the pledget is without influence, even if mobility is preserved, because it produces a momentary and rapidly exhausted change in pressure. In recent times manifold investigations have been made to restore the theory on sound conduction through the middle ear to its former authority, whose existence has been denied by some authors. Especially those of Lucae must be mentioned. Recollecting the experiment previously noted, where the tuning-fork let into the mastoid process caused clearly perceptible vibrations of the ossicles, according to Lucae, as regards air-conduction the greater part of the sound waves proceed directly to the labyrinth wall, but they are so dampened by the drum membrane that they scarcely enter the bone. They are more likely to be reflected from it. Lucae's view is directly opposed to Zimmermann's, who considered bone especially suited for the entrance of waves. Besides, Lucae is of the opinion that the round window is capable of receiving sound waves, as is shown in the experiments of Johannes Müller. He showed that air waves are transmitted readily through stretched membranes to the labyrinthine fluid. Lucae holds Zimmermann's idea of outward displacements of the membrane of the round window to be improbable, as longitudinal vibrations are found in the labyrinthine fluid. He quotes a case of imperfect development of the ear reported as early as 1867, where there were a rudimentary auricle and absence of the external meatus. In its place there was a solid mass of bone, and the tympanum

consisted of nothing but a slit without a window. But for all this, the tuning-fork a^1 was heard at the rudimentary auricle. Lucae thinks that in the absence of windows the escape of sound waves was not possible. But this permits a direct conduction through the bone in the sense of Zimmermann. In other similar cases of Bezold's (7) with malformation of the ear, air-conduction existed for notes up to a certain limit, viz., in one case to d^1 and in another to a^1 .

Lucae (8) reported at the Naturforscherversammlung of 1901 on experiments with pipes with which he was able to discover, in the living, the movements of the drum membrane for differential tones. Based on observations made with the stroboscope on the electro-motive pneumo-massage of the drum membrane, he found that the vibrations of the drum membrane could be observed with the stroboscope in a speed of the plunger of two thousand vibrations and upwards. The vibrations were greatest in the posterior superior quadrant, the frequency of the vibrations corresponding approximately to that of the frequency of the lowest tones of sixteen vibrations a second. These were produced by interference tones with pipes set on bellows. The drum membrane was observed through a Siegle's speculum, which was connected by a T-shaped tube with the pipes. It was not placed airtight in the canal, but the massage effect was nevertheless obtained. Then the movements of the drum membrane caused by the sound of the pipes was noted with the stroboscope driven by an electro-motor. The observations showed a wavy motion of the posterior upper quadrant; no movement of the anterior half of the drum membrane or of the malleus could be seen. An objection can be made to this observation of Lucae on the same grounds which Zimmermann found against those of Helmholtz and Politzer, viz., that the pipes were directly attached to the ear by the tube. Thus the possibility of a direct transmission of the air vibrations in the pipes was present. No motion of the malleus or light reflex was noted, as in the similar experiments of Mach and Kessel. The associated vibration of the chain is not proven. From the experience with the phonograph, a vibration of the whole chain would seem very probable, but

up to the present time it has not been proven. Possibly stiff membranes and rigid attachments give a better sound conduction than the drum membrane and the ossicles.

Kleinschmidt (9) in his paper on sound conduction to the labyrinth through an air chamber found that a plate or a membrane must be in perfect equilibrium to respond to the slightest air movements. The motive force must act at right angles to the forces which support the membrane. This is not the case with the drum membrane and ossicles, as they are situated in the plane of the progressive air waves. Moreover, a registering apparatus, such as Helmholtz considered the chain of ossicles to be, must be motionless. This is plainly not the case, and according to Kleinschmidt the transmission must be inaccurate. Helmholtz and especially Johannes Müller understood the chain to vibrate as a whole. The first condition, however, of equilibrium is not fulfilled by the drum membrane. Kleinschmidt has doubts also on the conduction of all notes through the chain, since the amplitude of most notes was less than $0.02mm$. He also doubted that the accommodating muscles could act as quickly as was required by the vibrations of a rapid succession of sound, provided that the apparatus must vibrate as a whole. According to Gad, the stage of latent stimulation of a previously slightly contracted muscle is 0.004 second. If this is so, the muscular apparatus would not respond to 250 vibrations per second. Kleinschmidt does not deny all conduction through the middle ear as Zimmermann does, but regards the middle ear, together with the mastoid cells, to act as an air chamber for the transmission of sound. The column of air is very accessible to sound as the drum membrane $0.1mm$ thick offers no obstruction. It appears, also, that the freely movable membrane of the round window can only be set in motion by the sound waves or air of the middle ear. The resonance of the drum cavity, while it is filled with air, is of little account. The drum membrane with the stapes is driven inwards by the low notes, but this action comes a moment later than the motion in the labyrinthine fluid arising from the round window; therefore the chain of ossicles must work as a damper. The elastic chain of

ossicles is very well suited to perform this function. The intrinsic muscles have no other function than to protect the labyrinth from too strong blows in restricting the mobility of the tympanic ear cavity. It follows that the middle ear is necessary for the hearing of low notes.

In a second paper Kleinschmidt published experiments with an air chamber in air and under water. A loss for the low notes on their transmission through the air in this air chamber was noted. For the air chamber he used a cylinder or glass funnel; this was closed at one end by a membrane and the other end carried a hearing tube. He quotes König's experiments with the gas chamber and adds that the air being a similar medium should vibrate still better than the gas. But in reality a diminution for all tuning-forks occurred through the air chamber in proportion to the compression of the air. The drum cavity, however, is so small that its lessening action is inconsiderable. In the under-water experiments the membrane of the funnel was put 1cm under the surface of the water and the tuning-fork 1cm over it. With the help of the tube at the lower end of the funnel, Kleinschmidt could prove that the low notes showed no loss of sound, but the high tones did. He supposed this to prove that the high tones proceed directly through the labyrinth wall to the shortest fibres of the basilar membrane. The low notes set the long fibres in motion indirectly through the fluid. This conduction is facilitated through the tympanic cavity acting as an air chamber. The conduction of deep tones is made difficult or impossible without this air chamber, or if the air in it is too strongly compressed. Kleinschmidt explained in this way the decrease in hearing for low notes when the drum membrane is wanting.

Dennert (10), a sturdy follower of Helmholtz, has tried to answer Kleinschmidt on the question of the conduction of sound from air to the basilar membrane situated in fluid. Dennert found by previous experiments that in water the tuning-fork vibrations suffered a diminution, and that the high tuning-forks died out quicker than the low. The dampening in viscid fluids is greater than in water. At first

he was unable to produce a resonance of the tuning-forks in water with those vibrating in air. When he put a funnel covered with membranes in water he perceived no resonance, not even when he inserted a rod of wood like the columella of birds. Resonance was only obtained when the base of the tuning-fork vibrating in the air was set on the base of the tuning-fork in the water. Later he modified this procedure by connecting the tuning-fork in the water, by a slender rod with a rubber plate at one end, with the fork in the air. The latter fork, when brought into sympathetic vibration by a third fork, also set the one in the water vibrating. Instead of the direct connection of the tuning-forks, Dennert finally chose a funnel which was covered at one end by an elastic membrane connected in the same way by a little rod and was in contact with the tuning-fork in the water. Dennert found in this last experiment that the tuning-fork in the water gave a note about one and a half tones lower than the note produced by the one in the air. He then used properly proportioned forks— f sharp¹ instead of a^1 .

Dennert drew the conclusion from his experiments that in air-conduction an external auxiliary apparatus especially adapted for transmission of sound vibration to the fluid was necessary. The transmission of air waves occurs in the air and not in the fluid, as was shown by his connecting rod. The excitation of the tuning-fork in the water was accomplished chiefly by longitudinal vibrations of tuning-forks when the bases are in contact. In the experiments with the rod, the transverse vibrations of the branches of the fork or of the membrane cause the sounding of the fork in the water. He thought this answered the question of the transmission of the air waves to the labyrinth. To my mind, Kleinschmidt's experiments are more pertinent than Dennert's. The former author could cause the vibrations of the tuning-fork in the air to pass to the fork in the water with aid of the air chamber and without any weakening in the case of the deep fibres. In Dennert's experiment there is a direct connection between the tuning-forks: the tuning-fork in the water did not respond directly to the air waves produced by the first sounding fork, but responded to the vibrations of the second

tuning-fork, which was also in the air, but first by means of the rod transmitted the waves to the one in the water. Dennert must, like Helmholtz, consider the drum membrane to act as a resonator for all notes and regard the second sympathetically sounding fork as equal to the drum. Kaiser, in discussing Dennert's experiments, made a good point in declaring a fundamental difference between these experiments and the true conduction of the ear chain. The rod in contact with the tuning-fork in the water transmits directly the resonance, whereas the stapes does not directly touch the fibres of the basilar membrane but only the vestibular fluid.

Kaiser (11) has performed experiments on the transmission of sound in fluid media with a telephone placed in the water. He took an ordinary telephone and bored two holes about 1 *cm* in diameter on both sides of the iron membrane without interfering with the transmission of sound, and with a new brass attachment set the telephone under water. The apparatus occupied about 50 *ccm*. A telephone will work in water as long as the water is kept out of it. When the note a^1 was sounded in the funnel-shaped tube with its end in the water, the note a^1 could be heard through the telephone. The tuning-fork c^2 was brought in front of the telephone plate, because the tuning-fork, according to Dennert, sounds one and a half tones lower in the water; a tuning-fork placed in front of the tube does not stimulate any sympathetic vibrations of the tuning-fork in the water. Then he took the telephone membrane from direct experiment. He demonstrated in this way that the lower and medium notes, under c^1 and over c^4 , disappeared, and the others were transmitted much weakened. Further, it appeared that by placing a membrane like the drum membrane on the brass tube over the telephone the sound conduction was better, but not so when a columella was placed between this membrane and the two closed openings in the telephone membrane. Kaiser concluded from his investigations that the intensity of sound is diminished by the passage of the waves to the labyrinthine fluid. By stopping one hole which corresponds to the foramen rotundum, and by employing a columella for the other, no lessening of the sound

resulted. Kaiser judged from this that the displacement of the labyrinthine fluid plays an insignificant part. He concludes that at all events molecular vibration also played a rôle in sound transmission, though he accepts as normal Helmholtz's idea of massive vibration.

If we take a retrospect on the attempts at revising the theory of Helmholtz, we must acknowledge that they are not as worthless as the opponents would have us believe. An object has been obtained, even if only new proof for the old theory has been furnished, as Lucae, Dennert, and Kleinschmidt have done. The proofs are still unsatisfactory, especially as regards the method of resonance of the sound waves. At any rate, through the careful proof of Kleinschmidt and Zimmermann, the resonance theory of the drum membrane of Helmholtz has become untenable. Moreover, from a physical and physiological basis, molecule vibrations must be admitted as possible. Kaiser and Gad have come to similar view. In total defect of the drum membrane the latter accepts molecular vibrations through the window membranes. According to my view, the hearing in mal-development of the ear where the windows are wanting speaks for a direct bone-conduction; the children heard the stretch b^1-g^{11} . If the molecular theory is correct, the middle-ear mechanism is not absolutely necessary for sound conduction, but only for dampening loud sounds. The views are also diverging on how the sound waves excite the fibres of the basilar membrane. It appears that bone-conduction is sufficient in itself to produce this without the assistance of the sound-conducting apparatus, as is seen in cases of the loss of drum membrane and in fixation of the stapes with lengthened bone-conduction. The hearing apparatus vibrates sympathetically, according to the researches of Lucae, but these waves are of small importance for the intensification of sound. Furthermore, the problem of the lengthening of bone-conduction has not been elucidated by the theory of Zimmermann, nor that of tinnitus or of the artificial membrane. The working of the latter in certain cases is still best explained by Lucae. The action of the pledget is present, even if it is neither in the vicinity of the

oval or round window but only on the front of the promontory. The result is the same if a dry or a wet pledget is used. Lucae explains this fact by the supposition that sound waves in absence of the drum pass through the promontory and the window in order to enter the labyrinth. Through this passage the sounds may be weakened. The wadding on the promontory wall retards interference, and the result is improvement in hearing. With a defective drum membrane, Lucae admits that the sound waves enter through the promontory.

As to Rinne's experiment, there is no doubt of its diagnostic value in ear disease. It does not lose in value even if one accepts with Zimmermann the difference between the two methods. Bezold (12) also recognized this difference, but according to him the experiment with the handle of the fork for tests with air must be different from those with the branches. If both are made to vibrate in the long diameter at the opening of the ear, the procedures are surely dissimilar. Bezold places the fork a^1 first on the mastoid process, then brings the branches in front of the meatus until the vibrations have ceased, and inserts the handle in the auditory canal. The tuning-fork will then be heard twelve seconds more. The same is the case with all tuning-forks up to c^2 . Bezold believes that this meatus caused a resonance-space.

More extended research is still needed to settle the question. It does not detract from Helmholtz's credit if his theory has been amplified or modified.

Whilst this was in press a discussion of the work of Carlo Secchi (13), *La finestra rotunda e la sola via dei suoni dall'aria al labirinto*, by Morpurgo, appeared in the *Arch. f. Ohrenheilk.*, vol. lv., Nos. 3 and 4. From this it appeared that Secchi had already maintained in 1890, before the international congress at Berlin, that the only way sound could reach the labyrinth through the air of the drum cavity was through the round window. He has compared the middle ear with König's gas chamber, but Secchi had experimented only with air-chambers in air, whereas the experiments of

Kleinschmidt were performed under water. The latter are nearer the natural conditions than Secchi's. Secchi's experiments on animals are interesting, and they support his theory conclusively. He fastened a manometer in an opening in the bulla ossea of dogs and cats, and found that the tympanic air pressure was about 4mm of alcohol greater than that of the atmospheric air. Every note, even the slightest which caught the attention of the animal, raised the pressure in the drum cavity. The pressure was also elevated if vowels were spoken in the ear, more with a, e, and o than with i and u. Variations in the pressure was brought about reflexly by the intrinsic muscles of the ear.

He experimented in total defects by conduction notes from a tuning-fork through a pointed glass tube. The sounds appeared more intense at the round window than at the oval. The summary of his results is as follows: "From the consistent results of physical and physiological experiments and the clinical observations, I arrived at the conclusion that transmission of sound waves through the labyrinth takes place only through the air in the drum cavity. The drum membrane serves only on the one hand as a stopper, and on the other as a passive regulator of pressure. The mastoid cells help to stop the phenomena or resonance just as the boxes in a theatre. The ossicles under the action of the intrinsic muscles regulate the intratympanic pressure during attentive hearing and protects the organ against detonations. During repose the pressure is regulated through the Eustachian tube."

Secchi's theory is imperfect, inasmuch as it does not admit of sound conduction through bone, for which there is unanswerable proof. Consequently the problem remains unsolved.

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13. SECCHI, *La finestra rotunda è la sola via dei suoni dall'aria al labirinto*. Reviewed in *Arch. f. Ohrenheilk.*, vol. 55, Nos. 3 and 4.

REPORT ON THE PROGRESS OF OTOLOGY DURING THE FIRST QUARTER OF THE YEAR 1903.

By DR. ARTHUR HARTMANN.

Translated by Dr. ARNOLD KNAPP.

ANATOMY OF THE EAR.

1. **Souques et Heller.** Congenital facial paralysis from lack of development of the temporal bone. *Arch. internat. d'otologie*, etc., 1903, p. 170.
2. **Apert.** Congenital atrophy of the left auricle; malformation of the right auricle; facial asymmetry; deformity of the parietal bones; supplementary fontanelle. *Arch. internat. d'otol.*, etc., 1903, p. 175.
3. **Moutard-Martin.** Malformation of the external ear. *Arch. internat. d'otol.*, etc., 1903, p. 181.
4. **Jurgens, E.** On the external auditory meatus in children. Dissertation. St. Petersburg, 1903.
5. **Reitmann, Karl**, cand. med. (Vienna). On the structure of the cartilage of the Eustachian tube in man. *M. f. O.*, 1903, 2.
6. **Haïke, H.**, Berlin. On the anatomy of the carotid sinus (plexus venosus caroticus) and its relation to diseases of the ear. *A. f. O.*, vol. lvii., p. 17.
7. **Rubaschkin, W.** (Petersburg). On the relation of the fifth nerve to the olfactory mucous membrane. *Anatomischer Anzeiger*, vol. xxii., 1903, pp. 407-415.
8. **Hammar, J. Aug.** On the development of the foregut and several of the adjoining organs. Part II.: The development of the second pharyngeal fissure. *Archiv f. mikr. Anat.*, 1902, vol. lxi., pp. 404-458.
9. **Cohn, Franz.** On the development of the olfactory organ in the chick. *Archiv für mikroskopische Anatomie*, 1902, vol. lxi., pp. 133-150.
10. **Zuckerkindl, E.** On the turbinal of the monotremes. *Anatomischer Anzeiger*, vol. xxi., 1902, pp. 386-391.
11. **Berliner, Kurt.** The development of the olfactory organ in the selachiae. *Archiv für mikroskop. Anatomie*, 1902, vol. lx., pp. 386-406.

1. A boy six years of age with bilateral rudimentary development of the external ear and right-sided facial paralysis. No

hearing examination was possible. Congenital bilateral hernia and monorchidia. The case is clinically analogous to the one described by Marfan and Armand Delille. The autopsy showed that the temporal bone consisted only of a small mass of bone, where the middle and internal ear as well as the facial trunk were absent. The authors believe that the same anatomical conditions exist in their patient, and explain the facial paralysis by the absence of the peripheric facial trunk.

OPIKOFER.

2. Insufficient development of the auricles as well as flattening of the left face of a child, where hydramnion was found present in the mother. The developmental disturbance is regarded as the result of an unusually high intra-uterine pressure, which compressed the various parts of the foetus as well as the left half of the head and the left shoulder for a considerable length of time.

OPIKOFER.

3. Rudimentary development of the left auricle, absence of the auditory meatus, left-sided deafness. Right ear normal. Similar to the preceding case, inasmuch as the left half of the face and of the skull were insufficiently developed, though a condition like hydramnion could not be discovered. OPIKOFER.

4. From his numerous and profound investigations the author comes to the following conclusions:

(1) In the first and second year the mastoid process is always compact.

(2) The squamoso-mastoidal suture is always patent up to the second year.

(3) The length of the drum membrane is not greater than the breadth, up to the fourth month. From the fourth month on, the length is greater than the breadth.

(4) The vertical and horizontal diameters of the auditory meatus do not change in the child proportionately in the various periods. Individual variations may occur.

(5) In all periods, of the four walls of the external meatus the lower one is always the longest; then comes the anterior; the posterior; and, as shortest, the upper.

(6) In the new-born there is no lumen in the auditory meatus. It is formed in the third month of extra-uterine life.

(7) There is a certain connection between the largest diameter of the external auditory meatus and the greatest diameter of the skull in the child.

(8) There is no connection in childhood between the greatest diameter of the skull with the greatest diameter of the drum.

(9) On comparing the following conditions, there is no connection between the growth of the child, the fronto-occipital of its skull, the walls of the auditory canal, and of the drum membrane.

(10) In the new-born the lower wall of the external auditory canal does not form an angle with the drum membrane. This is formed in the third month of life.

(11) The upper wall of the external auditory canal and the drum membrane in the foetus are situated on a level. After birth an angle is formed between the two which in the child is always greater than in the adult.

(12) The angle of inclination of the drum membrane exists in the new-born, and gradually increases with age.

(13) The angle formed by the lower angle of the canal and the anterior margin of the drum increases in extra-uterine life with the age of the child.

(14) The angle of declination of the drum membrane changes in the child in general inversely proportional to the age.

(15) The dimensions of the ossicles are not different in the child than in the adult.

SACHER.

5. The cartilage in the Eustachian tube of the new-born is a typical reticular cartilage. In the adult the elastic fibres surround the cartilage cells. Occasionally there are vascular channels in the cartilage which generally carry veins. The fatty degeneration of the cartilage occasionally appearing, is regarded by the author as responsible for the fragmentation of the tubal cartilage.

PIFFL.

6. The author has examined the anatomical relations of the carotid sinus on a number of heads of children and adults in which the vessels have been injected, and sections have been made through decalcified temporal bones. He concludes as follows:

(1) The venous channels which accompany the internal carotid artery within the carotid canal are so arranged that they usually surround the horizontal and the descending branch, though they are slightly present about the knee.

(2) The structure of the carotid sinus is usually divided, though it may be built on the plan of a venous plexus, so that both

terms, sinus and plexus caroticus, are proper. The size and the position of the subdivisions vary.

(3) The small subdivisions of the sinus enlarge to large areas in age.

(4) The statement of Ruedinger that the carotid and the sinus divided the space of the carotid canal, does not hold true for the author's specimens, especially not for the child.

The clinical importance of the sinus is from its relations to the tympanum, on the one side, and to the interior of the skull, on the other, as the sinus wall is a continuation of the dura. A pre-formed way is furnished for the inflammatory processes to travel from the tympanum to the interior of the skull. According to the author, severe hemorrhages can rarely take place from the sinus; for instance, in the cases with large areas in old people. Occasionally inflammation and thrombosis of the venous channels may cause a chronic thickening of the carotid walls and thus a protection against dangerous hemorrhage. HAENEL.

7. Grassi, R. y Cajal, Retzius, and others have found intra-epithelial fibrilli in the olfactory mucous membrane where no nucleus nor terminal organ could be discovered. The author has examined these fibrilli in a chick embryo nine days old, by means of Golgi's method. He describes an olfactory branch of the fifth nerve passing from the Gasserian ganglion to the olfactory mucous membrane, and forming an olfactory ganglion of the fifth nerve before entrance into the latter. Nerve fibres pass from the bipolar and multipolar cells of this ganglion to the olfactory mucous membrane, form a subepithelial connection, and enter in between the olfactory cells without entering into any communication with them. These are the isolated fibrilli which have been observed by the earlier authors, and which appear to belong to the fifth nerve. ESCHWEILER.

8. The paper is divided into four chapters:

(1) On the disappearance of the second pharyngeal fissure in man. According to the author, the second pharyngeal furrow, from which the so-called branchial arch and the pharyngeal fissure organ are developed, disappear without any trace. Of the second pharyngeal pocket, a dorsal declination remains, the later well defined tonsillar depression. The tonsillar tubercle at a later period grows into this.

(2) The development of the tonsil in man. . Tonsillar recesses

develop out of the tonsillar depression. Lymphatic tissue develops in these recesses. The tonsillar tubercles in man are not connected with the formation of the tonsil.

(3) The development of the tonsils in several vertebrates. Two types of development are distinguished. In the first the tonsillar tubercle grows into the greater part of the tonsil (rabbit, squirrel, cat, and dog). In the second it disappears (pig, calf, and sheep). The latter type is the one which exists in man. In the rat, which does not present any tonsils in the adult condition, there is no trace of any developmental stage.

(4) On the histogenesis of the tonsil.

The epithelium of the tonsillar depression sends off bodies and prolongations into the depth. About these, lymphoid elements are collected, which are, however, not of epithelial origin. According to the author, these epithelial prolongations atrophy, while the cells of the lymph follicles originate from the fixed connective-tissue cells.

ESCHWEILER.

9. A number of details of previous authors concerning the walls of the olfactory groove are related. The first prolongation of the groove takes place by the active growth of the olfactory epithelium. Later the mesoderm and ectoderm are connected with the depression of the olfactory groove. A flat depression, lined with sensory epithelium at the medial wall of the olfactory groove near its opening at the surface of the face, is regarded by the author as the original position of Jacobson's organ, which is wanting in the grown bird. This is only present in embryos of 5.3 and 5.9 mm length. The turbinal of the chicken is developed from the lateral wall of the olfactory groove, and corresponds to the naso-turbinal of the vertebrates.

ESCHWEILER.

10. The maxillo-turbinal of the ornithorhynchus and three examples of the echidna are described. The author finds a confirmation of his previously stated opinion that there is a distinct difference in the structure of the lower turbinal in the two classes of the monotremes.

ESCHWEILER.

11. The embryos of the *akanthias* and the *pristiuris* were examined. In the former embryo, of 5 mm length, there was a distinct presence of the olfactory organ in the shape of two flattened thicknesses of the ectoderm. Through extension laterally and in the depth of the sensory epithelium, the olfactory surface becomes converted into a groove. At first only the sensory epithelium is

known that after the non-differentiated sensation has been (so far as it is) a subject matter, the sensory equilibrium is imposed by the sensation.

The sensation is first noticed on the inner surface of the efferent, the point is far from the sensory equilibrium.

HAERTEL.

PHYSIOLOGY OF THE EAR.

12. **Lucae, August, Rev. n.** On the reaction of sound conduction through the middle ear in the case of a patient. *A. f. O.* vol. lv. p. 12.

13. **Myers, Charles S.** Hearing when taste and smell of the tongue. *Anthropology* 19. *Experiment in Tastes and Smells* vol. 1, part 2.

14. **Wittmaack, K.** On the action of quinine on the auditory organ. *Pflüger's Archiv* vol. xxv. p. 209.

15. **Urbantschitsch, V.** On influencing subjective visual impressions. *Pflüger's Archiv*, vol. xxv. p. 347.

16. **Babinski, J.** On the mechanism of vertigo. *Bull. de la Soc. de Biologie*, March 14, 1903.

12. After referring to the theory of waves of Weber's, and to previous experiments of his own, the author attacks the paper of Leiser (*A. f. O.*, vol. lv.). He first takes exception to the statement that solid bodies conduct sound waves better than air. It seemed very much more probable that the sound rapidly in rapid elastic bodies is greater than in the air; in iron, seventeen times; in dried bones of oxen, nine times greater than in the air. Leiser's experiment that the tone of a tuning-fork can be preserved at greater distance if the handle of the fork be connected with the auricle by a staff of wood, does not prove that sound is transmitted better in bone, but that vibrations of solid bodies can be continued through uniform media much more easily than through a medium of a different kind, such as air is. A modification of Leiser's experiment has furnished Lucae with a proof that sound conduction in bone and steel is weaker than sound conduction in the air; in other words, that solid bodies rapidly absorb tones, the rapidity increasing with the pitch of the tone. The short waves of the higher tones are more rapidly absorbed in air than the long waves of the deep tones.

HAENEL.

13. The expedition, supplied with all scientific aids, returned with a great number of anthropological and ethnographical treasures, and some material on the investigations of the sensory function of hearing, taste, and smell, which are of interest to our readers.

The report on the wonderful visual acuity of savages as compared to the Europeans has been corrected by recent investigations. This same has been found true in regard to the sense of hearing. Many authors have found no difference. The author examined with Politzer's acoumeter and with Runnie's watch, and concludes that the hearing of the Torres Straits Islanders is somewhat inferior to that of the Europeans. In this connection it must be remembered that the number of observations is small, and that many savages suffered from traumatic perforations of the drum, with hemorrhages and subsequent purulent otitis, from the habit of diving after pearls. It can, nevertheless, be taken for granted that an unusually good hearing power does not exist in the Papuans. The upper tone-limit was examined with a Galton whistle, without finding any difference. The power of distinguishing differences in tone was examined by means of tuning-forks of the same number of vibrations. In the natives it was found distinctly less than in the Europeans.

In regard to the sense of smell, many explorers have written of the great ability of the original tribes in this connection. The examinations of this author by means of Zwaardemaker's olfactometer and with a solution of camphor showed that the sense of smell in the Papuans was somewhat higher than in Europeans. The astonishing ability to recognize objects by their smell from a distance, is explained by the author to be due to the knowledge and custom, and consequent memory, rather than to the absolute acuity of the sense of smell. The perception of good and bad odors was the same as with us. The smell of nations was confirmed, as the Papuans were able to recognize Europeans and Australians from their odor. The various people of the same race could not be distinguished by their smell.

The sense of taste was examined with sugar, salt, vinegar, and quinine. All pleasant things were regarded as sweet, unpleasant as bitter. Salt was usually preferred to vinegar. The native word for "sweet" means "well tasting." There is no word for "bitter."

KARUTZ.

14. The first part of this paper treats with the question, Is the action of quinine on the auditory organ to be referred to disturbances of circulation?

From clinical observations of previous authors, it can be stated with certainty that the hearing disturbances produced by quinine, do not depend upon changes in the middle ear.

The author has poisoned a number of rabbits, guinea-pigs, cats, and one mouse, with fatal doses of quinine. The middle ear and the labyrinth were examined, and found in all of those cases where before the entry of the final convulsions the animals were killed by bleeding to death, that no hemorrhages or hyperæmias were present. The investigations in regard to ischæmic changes in the labyrinth or in the auditory trunk were also negative. From analogy of the action of quinine on the retina, he is inclined to accept the possibility of an ischæmia of the membranous labyrinth. The second part of the paper treats of the effect of quinine on the nervous system of the auditory organ.

The author believes to have discovered a specific action of quinine on the ganglion cells of the spiral ganglion.

The ganglion cells of the control animal presented sharply differentiated granulations on a red-stained protoplasma ground, while the cells of the quinine animals showed in a diffuse bluely stained protoplasma a few Nissl's bodies as dark blue granules. After prolonged differentiation, when the bodies of the normal cells have lost their blue color, the ganglion cells of the quinine animals become as sharply differentiated as before in the normal animal. As the other bodily cells do not show such a tinctorial condition, these changes in the ganglion cells can be regarded as changes in the condition of the cell; in other words, a disturbed vital activity.

DREYFUSS.

15. In this study of the apparent movement of objective pictures, our treatment concerns itself especially with those occurring spontaneously, caused by external influences such as acoustic impressions.

The experiment showed that impressions of sound were able to cause apparent movements, differing according to the sounds as regards their pitch and intensity. The apparent motion can be associated by a disturbance of equilibrium on the approach of a sound. Mucous or cutaneous irritation may cause an apparent movement.

The experiments of the author on the apparent movements of objective pictures following cold irrigations of the ear, variations in air pressure in the tympanum, and the action of the galvanic current with the anode or the kathode in the canal, are, in my estimation, quite physiological processes.

The above phenomena can be produced easier on monocular vision, most easily in after images, which is treated in a second

chapter. A third chapter treats of the influence of color sensations on objective and subjective visual impressions, and a final chapter on the influencing of color perceptions by these.

The study is of interest for all of those acquainted with the audition colorée, with disturbances of equilibrium and the perception of certain tones, and especially for psychologists.

DREYFUSS.

16. It is now well established that the deviation of the head resulting from the passage of a galvanic current through the head depends upon an irritation of the labyrinth and not upon an irritation of the nervous central organ. It has, however, always been unclear how this turning of the head takes place. Does it depend upon the irritation of one labyrinth with the paralysis of the other, or the presence of both conditions at the same time in different parts of both labyrinths?

The author has attempted to solve this question. In a dove, the vestibule and the semicircular canals were exposed and electrodes applied; one upon a definite part of the labyrinth, the other about $\frac{1}{2}$ cm posterior. On closing the current, turning of the head was noticed to the exposed side if the positive electrode was applied to the labyrinth, turning toward the intact side when the negative electrode was applied to the labyrinth. The later movement was always more violent. He was not able to produce various movements of the head by placing the electrode on different circular canals or vestibule. He believes this to be due to an incomplete isolation of the various parts of the labyrinth in his experiment. After destruction of the vestibule and of the ampulla, the phenomenon cannot be produced, though it is not prevented by destruction of the greater part of the semicircular canals. The former are therefore physiologically the more important. In chloroform narcosis the reflex is also absent.

DREYFUSS.

(To be continued.)

BOOK REVIEWS.

X.—**Ein objectives Hörmass u. seine Anwendung.** (An Objective Hearing-Measure and its Use.) Von Prof. PAUL OST-MANN, Executive Surgeon of the University Policlinic for Ear, Nose, and Throat Diseases at Marburg, Germany. (Dedicated to Prof. Bezold.) I. F. Bergmann, Wiesbaden, Germany.

The text of this monograph occupies twenty-seven pages in 8vo; the rest, by far the greater part of the work, consists of numerous very large, repeatedly folded plates. The author criticises the methods of determining the hearing acuteness of healthy and diseased ears which have thus far been in use. The most popular of them is to note the time how much longer tuning-forks, struck with supposed equal force, are heard by the healthy ear than by the diseased one. For instance, if 150 seconds by the healthy and 75 by the diseased, then the hearing acuteness is denoted $H = \frac{150}{75} = \frac{1}{2}$. This and similar methods and the graphic representations of the results of the examinations of hearing by HARTMANN are wrong, as JACOBSON pointed out almost twenty years ago.

BEZOLD and EDELMANN determined the vibration periods by supposed equal strokes for forks between C and c'. The erroneousness of their statements and deductions have lately been shown by a detailed, scientific revision from JACOBSON.¹

PANSE² distinctly showed the way that would lead to the discovery of an objective hearing-measure, but he failed by under-rating the difficulties inherent in the experimental solution of the problem. GRADENIGO's optical method proved equally unsuitable for the complete solution of the problem. The author expresses the problem as follows:

¹ Jacobson and Cowl. Engelmann's *Arch. f. Physiologie*, 1903, 1 and 2.

² Die Schwerhörigkeit durch Starrheit der Paukenfenster. *Arch. f. Ohr.*, vol. xliii., p. 251, 1897.

"To determine the ringing-out curves of the unclamped forks C and G of BEZOLD-EDELMANN's continuous-tone series, of largest possible amplitudes down to the normal threshold value in such a manner that the amplitudes of the forks from C of the large octave to the c' of the four-times marked octave can be directly measured in second-intervals, or correctly computed from the measured values."

The arrangement to measure the amplitudes of the vibration of the forks is complicated. We can only sketch it here. The forks are screwed tight in a vice which, in its turn, is immovably inserted into a stone wall. The microscope with which the vibrations of the forks are measured is placed on an iron table-plate, which is supported by iron bars inserted into the wall. The finest dried flour dust is strewn on the end of one of the prongs of the fork, and one of the granules nearest to the edge is selected as the object of observation. The excursions of this granule are measured with the micrometer of the eyepiece, from the starting of the vibrations to their cessation.

To set the forks into vibration, an instrument similar to a Roser mouth gag, but with finer and numbered tothing, forces the prongs asunder, so that it may be released at any degree of tension and at any time. Thus the initial force of vibration can be made the same at any experiment, a condition which has proved by no means the same when the fork was struck in the usual way, even by experts.

To take observations as here described requires three persons: the first, the observer, who measures the vibrations; the second, who watches the periods of time of the vibrations; and the third, who notes the numbers of the micrometer values called out by the others.

The author has, according to this method, examined a number of soldiers with healthy hearing organs, and afterward his own (he is forty-four years old), and found his acuteness of hearing normal.

The normal amplitude of a tuning-fork is that amplitude of a fork at which its tone dies away in a normal ear; this means the normal threshold-value. The dimensions of normal amplitudes for some forks, as determined by the author, were:

C	0.067 mm
G	0.012 "
c	0.0045 "
g	0.0009 "

It has not been possible to measure higher tones, and how to do it is a question.

The average duration of perception of the normal ears of the author was:

C	5 min.	11 secs.	g ¹	2 min.	33 secs.
G	3 "	10 "	c ³	1 "	20 "
c	3 "	11 "	c ³	1 "	54 "
g	2 "	29 "	c ⁴	0 "	47 "
c ¹	4 "	35 "			

With this the author says we have an objective uniform hearing measure of the unclamped forks from C to c⁴.

These data are serviceable for practical and scientific purposes. They show how far the defective ear is below the normal ear. With three forks, C, c, and c⁴, we can, by the aid of the tables given in the monograph, determine the difference between the threshold values of the normal and the defective hearing organ. The author thinks that, for the present, we would do better to express the hearing-defect by the simple multiple of the normal amplitude than by its square value which, undoubtedly, is scientifically correct.

We have given a rather extensive abstract of Professor Ostmann's monograph, because it treats of a very difficult subject in an earnest spirit. His work denotes an extraordinary amount of labor and, as far as it goes, in the right way. Nevertheless we think that his work, as that of his predecessors, is only a step in the right direction. The intensity of sound is directly proportional to the square of the amplitude of vibration and inversely to the square of the distance. The tuning-fork is a very valuable means of testing the function of our hearing organ,—audition,—but it is not the only means. It has only one sound. All musical instruments, of which the human voice concerns us most, possess, besides pitch and intensity, the quality of sound, "*Klangfarbe*" (clang-tint, timbre), which has a great influence on the audibility—*i. e.*, the perception and conception of what we hear. The various consonants, as well as the vowels, have different degrees of audibility, which greatly depend on their pitch and intensity. The tuning-fork measures pitch and intensity, both of which are of the greatest influence on a correct diagnosis and treatment of ear diseases.

If, in practice, we want to make a satisfactory examination of the acuteness of hearing, the best way, for the present, is to deter-

mine the audibility of speech, which also is proportional to the square of the distance.

Even knowing that, to denote it by a simple fraction of the distance is perfectly explicit and available for our purpose, just as the acuteness of sight has been satisfactorily expressed for years. Next in importance is the determination of the field of audition, the upper and lower tone limits and the tone gaps (defects) between the limits. What, if any, influence the clang-tint has on the audibility of speech and music has never been the object of enquiry. Whether the direct measurement of the vibrations of a tuning-fork by Ostmann or the shadow method of Gradenigo will be made available for the daily practice, the future will show. The reviewer is not prepared to endorse the author's negative opinion on Gradenigo's method.

Ostmann's experiments form a new method of exact scientific research, of which good results may reasonably be expected. Thus far it is cumbersome, but what is scientifically correct, though complicated, may with time be simple and easy, and find its place in the consultation room of the practitioner as well as in the laboratory of the university professor. H. KNAPP.

XI.—Diseases of the Ear. By E. B. DENCH, M.D. Third edition. D. Appleton, New York, 1903. 718 pages. Price \$5.00.

In the preface to the new edition of this well-known text-book it is stated that owing to the great advances made in otological surgery within the last years a complete revision of the chapters devoted to operative treatment of chronic suppurative otitis media and of the various intracranial complications of middle-ear sup-puration has been made necessary.

As this book was extensively reviewed in vol. xxiv. of these ARCHIVES, we will return to the revised part, beginning with chapter xxix., where a very complete and clear description of the so-called radical operation is given. It is to be regretted that the author sees it wise to continue the use of the term Stacke-Schwartz, a name with which the radical operation has become known in this country, as it is incorrect and therefore misleading, and its use should be dropped. The method of operating practised by the author consists in first exposing the mastoid antrum in the typical manner and then breaking down the partition between this opening and the auditory canal. In cases of unusually small antrum, or where the lateral sinus is displaced forward, this

method may be extremely difficult and a very dangerous one, especially in hands which are not thoroughly trained, and it is just in these cases that the advantage of the true Stacke operation is to be found. It seems to the reviewer, therefore, that the operation which carries the name of Küster-Zaufal, and which consists in an enlargement of the auditory canal in a superior and posterior direction until the antrum is reached or, in case of the inaccessibility of the antrum, the attic becomes exposed, is to be preferred. On page 548 it is stated that the fibro-cartilaginous meatus, after having been divided by an angular knife, is pulled out of the bony meatus with a strip of gauze. This is not to be recommended, as it is very important to leave the part of the membranous canal which is in contact with the anterior meatal wall as intact as possible. The necrosis of the anterior bony wall, which is otherwise liable to follow, is extremely obstinate and unpleasant to deal with. We find that one point has not been sufficiently emphasized, and that is the importance of making the actual opening into the middle ear as large as possible; in other words, of removing all of the overhanging bone consisting of the posterior margin of the annulus tympanicus which covers the recess in the posterior wall of the tympanic cavity. This recess is developed to a varying extent and is frequently the site of caries; if so, an insufficient removal of the overlying ridge of bone of course renders the result of the operation futile.

A number of plastic operations are given. The author favors the Panse method and sutures the edges of the flaps to the posterior periosteal margin with catgut. The posterior wound is always closed. Primary skin-grafting has been practised by the author with apparently considerable success and satisfaction. It seems to us that the description of this step has received an exaggerated importance and amount of space.

The author's results are: of 70 cases operated on, 53 were healed, 8 improved, 1 unimproved, 1 unknown, and 7 still under treatment. Nothing is mentioned of the length of after-treatment nor of the final hearing result.

The heading, "Accidents during Operation," include injury to the facial nerve and to the dura. We cannot share Dr. Dench's opinion on the gravity of the latter accident; in many cases it is impossible to complete the operation without exposing the dura, usually of the middle cranial fossa. In regard to injuring the facial nerve, of course the all-important fact is an exact knowledge

of anatomy; then if the operator will conduct his work in such a way that he always sees what he is doing and is not hampered by blood, the danger of injury to this nerve should be avoided except in cases, of course, where it runs an anomalous course. Perichondritis of the auricle is spoken of as an accident, though it is unquestionably a wound infection, and in the reviewer's opinion is chiefly due to an insufficient resection of the cartilage.

It is of course very difficult to describe an operation of this character in a text-book, just as it is impossible to master it from a written description. At the same time it is very interesting and instructive to learn the methods which an operator of the extensive experience of the author has selected as best, though we should have liked to have seen more exact indications given for this operation.

In the chapter on sinus thrombosis the author, for purposes of diagnosis, recommends a "good free incision," preferably below the knee of the sinus. He believes that involvement of the jugular vein is to be diagnosticated more by the severity of the septic symptoms than by local changes in the neck. If free hemorrhage does not occur from below in exploring the lateral sinus, and the tissues behind the middle of the jaw are infiltrated, and the fluctuations in the temperature have been well marked, it is necessary to deal with the internal jugular vein. Instead of ligation, the author prefers resection, which is practised from the clavicle to a point just above the common facial branch. The operation on the neck is very fully described, and the anatomical relations of the great vessels are elucidated by two excellent text-plates. Irrigation of the jugular bulb from below is not favored. The wound in the neck is sutured. In nine cases of excision of the internal jugular vein, eight recovered and one died, which is surely a very remarkable result.

In the chapter on brain abscesses the method of operating from the external surface of the skull, *i. e.*, through the squama or through the occipital bone, is still advocated, though it is becoming generally more accepted to be better practice to expose these areas from the walls of the middle-ear cavities. The author recommends that the dura should always be reflected and puncture of the brain substance made with a knife. The abscess cavity is not irrigated and should be packed with gauze. A. K.

EDITORIAL NOTICE.

The **Archives of Otology** is a bi-monthly journal, published in annual volumes of about five hundred pages each, extensively illustrated with cuts in the text, half-tone text plates, and lithographic plates, many in colors. About three-quarters of the space is devoted to original papers, and the remaining quarter to a systematic report on the progress of otology, and to reports of societies, book reviews, and miscellaneous notes. The papers and reports are original, and only accepted with the understanding that they are to be published in this journal exclusively. The original papers in the English edition appear in the German (*Zeitschrift für Ohrenheilkunde*) either in full or in more or less abridged translations, and *vice versa*. Any subscriber who wishes to refer to the original text of a translated or abridged paper may, by applying to the editor, obtain a reprint which he is expected to return after perusal.

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ARCHIVES OF OTOTOLOGY.

A CASE OF THROMBOPHLEBITIS OF THE CAVERNOUS SINUS, COMPLICATING AN EMPYEMA OF THE SPHENOIDAL SINUSES AND ETHMOIDAL CELLS, MISTAKEN FOR A THROMBOPHLEBITIS OF THE LATERAL SINUS.

BY DR. C. E. FINLAY, OF HAVANA, CUBA.

H. L. P., a native of Grand Rapids, O., æt. sixteen years, and by profession a seaman on board U. S. S. *Essex*, was brought in an ambulance to "Mercedes" Hospital, of Havana, on the morning of April 1, 1903.

Dr. G. L. Angeny, of the *Essex*, who accompanied him and who had had him under his charge, gave me the following **history**: The patient had had a purulent discharge from his left ear for several weeks. Two days before, he began to have intense pain in the left ear and other symptoms of suppurative middle-ear disease; he was then admitted to the sick-list with a temperature of 104° F. The *Mt* had been punctured on the night of March 30th, and a profuse purulent discharge started. The discharge continued part of the next day, when it diminished considerably, and the pain and high temperature returned. Patient complained of diplopia and was delirious.

Condition on Admission.—The patient was delirious, unconscious, semi-comatose; the skin was cold and clammy. Temperature, 104° F. Pulse, 120, small, irregular, and intermittent. Left ear: small perforation of the membrana tympani, with a small amount of pus in the external auditory meatus. Eyes: paralysis of left external rectus; pupillary reaction normal; fundi normal.

My diagnosis was a sinus phlebitis or cerebral abscess, complicating an O. M. P. C.

I advised an immediate operation, notwithstanding the almost hopeless prognosis.

Operation.—The patient was immediately prepared for operation and chloroformed. On being placed on the table, I noticed a leechlike swelling parallel and a little below the left superior orbital margin. I called my assistants' attention to it, stating that it showed that there was some obstruction in the blood flow through the ophthalmic vein, and that, combined with the paralysis of the left external rectus, it showed that the cavernous sinus was involved, and that the prognosis was still more forlorn. Still thinking, however, that the original trouble lay in the ear, I proceeded to shell out the mastoid, only a minute amount of pus being found in the antrum and middle ear. The tegmen tympani and bone over the lateral sinus were found intact. I proceeded, notwithstanding, to lay the lateral sinus bare; its consistence and color were normal, and on puncture healthy blood flowed through the needle. The temporal fossa was next opened externally, 2 cm above superior margin of the external auditory meatus: the dura was found healthy, the pia slightly cloudy; puncture of the brain in several directions was negative. Stimulation with strychnine having been necessary several times in the course of the operation and the patient's general condition being very poor, the wound was closed and the patient removed to his bed.

The temperature fell to 102° F., and the patient partially regained consciousness, but during the night the temperature rose again, the patient was violently delirious, the heart action became very poor, and notwithstanding repeated injections of strychnine and other heart stimulants, application of external heat, etc., the patient died at 4 A.M.

Autopsy.—No pus was found in the middle ear or antrum, no pus or sign of bone disease in the neighborhood of the temporal bone.

The dura was normal. The pia over the convexity showed some loss of transparency; that at the base was the seat of a dense plastic exudation.

Brain substance, cerebellum, and lateral sinus were normal; no sign of abscess. Cavernous and circular sinuses occupied by a purulent clot, which extended into the left ophthalmic vein. The sphenoidal and posterior ethmoidal cells were occupied by thick, yellow, fetid pus. After the patient's death, I wrote to both the family of the patient and Dr. Angeny; both answered that neither at home nor on board the *Essex* had he ever complained or showed any evidence of nose trouble.

Wholly unexpected were the *post-mortem* findings of this, to me, highly instructive case ; as, although the paralysis of the left external rectus and the dilatation of the left ophthalmic vein had made me suspect an implication of the left cavernous sinus, till the moment of the autopsy I located the original lesion in the ear and the intracranial lesion responsible for the lethal issue in its immediate neighborhood. The autopsy showed, without a doubt, that the middle-ear trouble was secondary to the nose trouble and in no way responsible, primarily or secondarily, for the symptoms which preceded the fatal termination of the case, these being solely due to the cavernous-sinus complication of the sphenothmoidal empyema.

This case, with so clear a history of prior ear disease and in which the symptom-complex so exactly corresponded to one of its best-known complications, shows that even in the clearest cases one must be somewhat guarded in giving an exact diagnosis. A correct diagnosis was, I think, almost impossible ; as, even giving their full value to the cavernous-sinus symptoms, the previous history and actual existence of the middle-ear trouble would more than counterbalance them and tend to the location of the primary lesion in the ear.

Another important lesson is that empyema of the sphenothmoidal cells may exist, and even bring about death, with no noticeable outward manifestations.

The necessity of not neglecting any nose trouble of this nature is self-evident, as at the stage of the disease in which the patient was brought to the hospital the case was hopeless, even if a correct diagnosis had been made, as one can scarcely seriously contemplate reaching the local lesion through the orbit or by means of a craniectomy even as a " forlorn hope."

CLINICAL EXPERIENCES WITH THE ENLARGED PHARYNGEAL TONSIL.¹

BY DR. H. GRADLE, CHICAGO.

THE writer praised the completeness of the first description of adenoids by W. Meyer, to which but little of importance has been added since his first publication. The characteristic facial expression, or adenoid habitus—the half-open mouth, the thick upper lip, the thin and pinched nostrils, and the sleepy look of the lower eyelids,—suggests the diagnosis of hypertrophy of the pharyngeal tonsil as a rule, but there are exceptions in both directions. The writer has seen the same facial expression in children with suppurative rhinitis with comparatively narrow nasal passages, who had either a normal or, at most, a very slightly enlarged pharyngeal tonsil. In the latter case, however, even this slight enlargement should be removed to effect a cure. But in these instances the operation is not followed by the immediate and pronounced benefit usually seen. The adenoid habitus may be wanting in children with unmistakable enlargement of the pharyngeal tonsil, especially when the latter causes disturbances less by its size than by its periodic inflammation.

The nasal obstruction is but partly due to the direct blockage of the post-nasal space by the hypertrophy. When such is the case, the child can neither breathe through its nose nor blow its nose. Most patients, however, breathe quite easily during daytime. The real trouble begins only when they lie down or during an acute "cold." This varia-

¹ Read before the Otologic Section of the New York Academy of Medicine, October 8, 1903. Abridged by the author.

tion in nasal obstruction seems to depend on periodic turgescence of the posterior end of the turbinals. Occasionally this can be seen in the post-nasal examination. It explains why it sometimes takes days or even weeks before the full benefit of a satisfactory operation is realized, because the wound keeps up a reflex turgescence.

The variable turgescence explains likewise why the characteristic adenoid "dead" voice is not equally pronounced in all patients. It is always characteristic in case of large hypertrophies, but may occur even in a normal person during a severe coryza. On the other hand, the inattention or want of mental concentration of some adenoid children—"aprosxia"—depends on the size of the hypertrophy and not on vascular distension. It was observed in about 15 per cent. of my patients, and only in cases of large growths, but not in every instance.

The writer recalled the distress and restlessness often caused by adenoids during sleep, which may lead to night terror and nightmare. Two instances of asthma were stopped, as far as the observation went, by the removal of the growth. Cough, so frequently present with adenoids, is usually due to a subacute bronchitis. But many instances are seen, too, in which it is a reflex cough, as it ceases immediately after operation. Enuresis is a very common symptom, sometimes promptly stopped, sometimes only gradually, by operation, and occasionally not influenced at all.

According to the writer's experience, much of the mischief started by adenoids is due to their periodic state of inflammation. This is not necessarily continuous. During a quiescent period, a moderate growth may cause scarcely any symptoms except slight blockage. But all adenoids are subject to frequent spells of inflammation, often subacute from the start, and sometimes lasting as long as the inclement season. Carefully taken histories show that attacks of bronchitis and inflammatory lesions of the ear are preceded by this inflammatory condition in the enlarged tonsil. Even the subacute involvement of the Eustachian tube, commonly called Eustachian catarrh, the writer does not attribute to the mere presence of, or pressure by, the adenoids, for they do not ordinarily extend close to the Eustachian orifice.

It is the extension of the inflammation from the pharynx which proves the menace to the ear.

The writer called attention to the relation of adenoids to phlyctenular disease of the eye. A large proportion of children with phlyctenular keratitis have adenoids, and in the writer's experience the immediate removal of the latter is often of unmistakable influence upon the course of the eye disease.

The writer confirmed the striking influence of adenoids upon the general nutrition in some instances. In about 20 per cent. weight and growth were below par and the children were frail and anæmic. This influence does not depend on the size of the growth. It may be due to a small tonsil which caused very little obstructive symptoms. Some instances suggest that adenoids may exert a poisonous influence on the system. The gain in weight and growth and the recovery from anæmia are often very striking after operation.

While in young children the operation is always followed by immediate and striking benefit, the results are not invariably so satisfactory, or at least so prompt, in older children. This is due to the complication by other hyperplastic lesions often induced by adenoids in the course of time. The faucial tonsils which are so often enlarged in connection with the pharyngeal tonsil, shrink not infrequently to a moderate extent and lose their irritated appearance after adenotomy. But spurs and ridges on the nasal septum and hypertrophies of the posterior turbinals, which seem to be favored by the long persistence of adenoids, continue, of course, in producing symptoms even after removal of the latter.

The writer considers the enlargement of the pharyngeal tonsil the consequence of repeated attacks of coryza during the first few years of life. He has observed this mode of origin in all instances which he could personally watch or trace. If no morbid growth of the tonsil has taken place within the first three or four years of life, there seems to be no further tendency to hypertrophy. The predisposition is often hereditary. It is also marked in instances of degeneracy, especially in imbeciles and in deaf-mutes.

Adenoids are strikingly common in scrofulous children. There are some instances in whom the so-called scrofulous

stamp is practically the outcome of the enlarged pharyngeal tonsil and disappears with its removal. But, on the whole, we must assume that real scrofulosis is the result of slight chronic poisoning of the system from some tubercular focus in the lymph glands. The enlarged pharyngeal tonsil is, as a rule, itself not tubercular. Only in about five per cent. of instances are tubercles found anatomically which cause no symptoms during life. The frequency, however, of enlarged lymphatic glands in the neck, in connection with adenoids, raises the suspicion that the diseased tonsil may permit the tubercle bacillus to enter the system without its causing local manifestations in the tonsil itself.

For the removal of adenoids the author recommends highly a personal modification of the Schuetz guillotine-shaped pharyngotome. The ordinary-sized instrument can be used in all subjects older than about three to four years. For younger children a smaller pattern is required. With the head thrown back, the lower jaw well depressed, the guillotine pushed firmly upward and backward, the entire tonsil is bound to be cut off in one sweep. A slip, as it sometimes happens with the Gottstein knife, is almost impossible. In over 200 instances there were but two in which fringes of adenoid tissue were left of sufficient size to permit a second operation. With this instrument, persistence of hemorrhage was never observed. In former experience a lasting or relapsing bleeding recurred in about one per cent. and was always traceable to incompletely detached tags. As the adenotome makes a clean sweep this danger is removed.

The quickness of the operation makes narcosis entirely unnecessary, except when the faucial tonsils are to be removed in the same sitting. In view of the great fatality of chloroform, as shown by Hinkel, the author considers this agent inadmissible. Ether, far less dangerous, has its drawbacks. Nitrous-oxide narcosis is quite practicable for simple adenotomy. But the writer finds that with his method of operating the pain is not sufficient to necessitate narcosis. For the removal of remnants of the tonsil left by an incomplete operation, the cold snare is very serviceable and but little painful. He uses a straight snare through the mouth with the wire loop bent upward.

ON THE PATHOLOGY AND TREATMENT OF CHRONIC PURULENT OTITIS.

I. INDICATIONS FOR THE REMOVAL OF THE HAMMER AND
ANVIL.

II. RELATIVE FREQUENCY AND LOCALIZATION OF DISEASE
OF THE OSSICLES.

By DR. SUCKSTORFF,

FIRST ASSISTANT OF THE EAR CLINIC IN ROSTOCK, GERMANY.

Abridged Translation from *Zeitsch. f. Ohrenheilk.*, vol. xlv., p. 75, by Dr.
ARNOLD KNAFF.

I.

IN 1879 Kessel placed the indications for the removal of
the hammer and anvil as follows:

1. Intractable stenosis of the tube.
2. Total calcification of the drum membrane.
3. Caries of the ossicles.
4. Anchylosis of the stapes if associated with disturbing
tinnitus.
5. Cholesteatoma of the tympanum and of the mastoid
process which is not improved by the usual methods of
treatment.

Stacke,¹ in his paper on the indications for the excision of
the hammer and anvil, in 1891, came to about the same con-
clusions.

The first two indications are so rare that they may be
disregarded. In the fourth, this treatment has been aban-
doned on account of the very questionable results obtained,

¹ *Arch. für Ohrenheilk.*, vol. xxxi.

and, in the case of the fifth, the so-called radical operation is probably now universally performed. The third indication, however, especially brought forward by Schwartz and his pupils Ludewig and Kretschmann, has proved to be an excellent means of healing chronic purulent otitis with or without accumulations of epidermis which are localized to the attic. We think that this indication should have a broader use, as ossiculectomy not only is indicated in diseases of the ossicles and in caries of the attic even if the hammer and anvil be healthy, but also in cases of purulent mucous suppuration from the attic, if this has not given way to a careful and consistent treatment with the tympanic canula. The hammer and anvil, with their ligaments and mucous folds, make the attic a very complicated cavity from which it is often very difficult to remove purulent secretion either by irrigation with the tympanic syringe or by other means. After the removal of the ossicles, the many pockets will lie open, and the complicated cavities are converted into one cavity more accessible to irrigation, so that we are often able to heal the suppuration. The removal of the healthy ossicles in these cases will be undertaken the more readily if the ossicular chain be already interrupted, and consequently worthless to the function of the ear; the useless ossicles act like foreign bodies, complicate and keep up the suppurative process.

This indication has of course been mentioned by a number of others, though it seems to us, from the experience of the last few years in our clinic, it has not been sufficiently emphasized. We have observed a number of suppurations in the attic with and without accumulations of epidermis, with and without disease of the ossicles, where long-continued syringing with the tympanic canula was without avail, but where the extraction of the healthy hammer led, in a very short time, to a permanent cure. Some of the cases of this kind, which were not healed, were cases in which there was an associated disease of the bone in the antrum or in the mastoid process, or a focus in the lower part of the tympanic cavity. In these cases we have later been forced to perform the radical operation. Unsuccessful extractions of the ossicles in cases where bone involvement

had not been previously diagnosticated will probably always occur, though they should be rare on proper selection of cases. It seems to me hardly right that, because we cannot always distinguish between simple catarrhal suppuration in the attic and bone disease, we should in all cases omit ossiculectomy and immediately proceed to the radical operation. In suitable cases the extraction of the hammer has been a most favorable procedure, especially as the patient will consent to an extraction of the ossicle so much more readily as it deprives him of his work only for a few days and does not subject him to the long after-treatment of the more radical operation. In other cases, though the suppuration from the attic may cease, it can continue from the neighborhood of the tympanic mouth of the Eustachian tube. The cause of this is either a suppurating pharyngeal tonsil which must be removed, or an inflammation in the tubal cells which we may attempt to cure by irrigating through the tube with the catheter, or even in the inverse direction from the tympanic cavity with the tympanic canula. As regards the technic of the operation, we have nearly always removed the ossicles in narcosis. It is thus only possible to work quietly and without doing any damage. The hemorrhage in most cases can be arrested by a brief packing of the canal or by introducing pledgets of cotton soaked in a solution of ferripyrin and cocain. Recently we have had very good results by applying adrenalin ten minutes before the operation. The incision of the drum and removal of the adherent hammer were always possible without hemorrhage. The operation was performed according to the conditions found present. If some of the drum remained, it was cut away and the adherent hammer loosened by a hook. The tendon of the tensor tympani was divided by a tenotome, though frequently it had been destroyed by the purulent process. For removal of the hammer we make use of the small polyp-forceps of Hartmann. We have found the snare in the presence of hemorrhage difficult to apply, and a fracture of the handle was not excluded. The anvil is displaced with Kretschmann's instrument. If this does not succeed readily, we do not persist, as a facial paralysis is not impossible after

a too energetic search for the anvil, and experience has shown us that in many cases the anvil is absent. Moreover, the following cases show that the remaining behind of the anvil does not necessarily interfere with the healing.

W. S., forty-two years old. Exacerbation of a chronic otorrhœa for 1½ months. There is a small marginal perforation up and in front, closed by a granulation. The granulation was removed with a curette. The epidermis masses appearing in the perforation were removed with the tympanic syringe. As this treatment, continued for months, was without avail, and the defect in the outer wall of the attic disclosed a large granulation in the position of the head of the hammer, we decided to remove the hammer in narcosis. No attempt was made to remove the anvil. After a few days the middle ear was dry and remained so for the period of observation—of over two years.

A. B., forty years of age. Left-sided otorrhœa after scarlet fever. Polypi and white masses repeatedly removed. The drum membrane is represented by a small triangle attached to the hammer, which is adherent to the promontory. The tympanic cavity is covered with epidermis. The hammer is removed and found to consist of the handle and the short process. The tympanum became dry in a very short time. After one and three-quarters years the ear was still dry. The anvil, which was previously invisible, has now slipped down and has become attached by cicatricial bands.

In some cases the simple ossiculectomy is not sufficient where the outer wall of the attic is diseased. This complication could usually be diagnosticated before operation, and we then removed the outer wall of the attic with a burr, as has been described by Sturm (these ARCHIVES, vol. xxxi.). After removing this wall of the attic, the anvil, if it was still present, came readily into view and could be easily extracted with a forceps. The after-treatment consisted of cleansing the tympanic cavity with a syringe and the tympanic canula. The irrigation with water was always followed by that of alcohol.

Before giving results, I should like to state what cases we regarded as cured. The period of observation must be at least one year, and no purulent secretion or crusts must

form in the tympanic cavity. It is, therefore, perfectly proper to regard cases as cured where a small relapse occurs which lasts for a few days, indirectly connected with the ordinary disease and due to an infection from the external auditory canal or from the tube.

In 72 cases, the hammer or the hammer and anvil were extracted 78 times on account of chronic suppuration. In 67, the hammer alone was extracted; in 1 case, the anvil; and in 10, the hammer and anvil. In 11, the radical operation had to be performed subsequently, as the result of the ossiculectomy was not satisfactory. Removal of the outer wall of the attic with a burr was done in 4. Of the 72 patients, 3 died, 2 from tuberculosis and one from scarlet fever. Of the 78 cases, 20 have been observed for a period of from one to five years. Of these, 11 showed no relapse, 5 suffered from a transient slight relapse, making 16; 2 were improved, and 2 were unimproved. Of these 20 cases, the hammer alone was extracted in 14. Of these, 5 have remained healthy without relapse and 5 with a slight transient relapse, which makes 10 healed cases where the hammer was extracted; improved, 2; unimproved, 2. Of the above 20 cases the hammer and anvil were removed in 6. All of these were permanently cured.

The length of treatment of the cases which we observed for at least one year varied between three and one-half and thirty weeks; the average was eleven weeks.

The hearing tests, so far as it was possible to make them, showed in no case a diminution of hearing.

In the 16 healed cases, the hammer and anvil were extracted 6 times. In the other 10 cases, the anvil was absent, or it was not possible to displace it with the anvil hook. As has before been stated, we do not persist in this step. In 4 cases which were not healed, the hammer alone could be extracted. On the other hand, it cannot be stated that the remaining behind of the anvil is responsible for the failure. In one case, the suppuration was distinctly kept up from the region of the tube. In the second case, the radical operation was made necessary on account of a disease of the bone. In cases 3 and 4, suppuration, very much diminished, continued after the extraction of the hammer and in-

creased after each exposure to cold. The constitution of the patient in these cases was, unquestionably, of some moment.

The results of our ossiculectomy in purulent otitis are : of 20 cases observed for more than one year, 16 cured, 2 improved, and 2 unimproved. In the other cases, which were not followed for such length of time, the result is probably a similar one, as the patients remained away on non-recurrence of the suppuration.

II.

If we take advantage of the ossicles obtained from the radical operation, we have, in addition to those above mentioned, a large number to study. In order to compare the frequency of carious disease—usually lacunar erosions—of the hammer to that of the anvil, it is only justifiable to make use of the material obtained from the radical operation.

We have an uninterrupted series of 106 radical operations, and disease of the ossicles was found to be distributed as follows :

Both ossicles : healthy, 5 ; diseased, 13 ; absent, 48.

With a healthy hammer : the anvil was found diseased, 10 ; absent, 2.

With a diseased hammer : the anvil was found healthy, 3 ; absent, 22.

Absence of the hammer : in cases of healthy anvil, 0.

Absence of the hammer : in cases of diseased anvil, 3.

In other words, the hammer was found diseased or absent 89 times : diseased in 36 %, and absent in 48 %.

The anvil was found diseased or absent in 98 : diseased in 24 %, and absent in 69 %.

Ludewig¹ found, in 75 cases, the hammer diseased in 60 %, the anvil in 85 %. These two statistics cannot be directly compared, as Ludewig employed ossicles which were extracted through the canal. The operation in his cases was undertaken for presumable disease of the ossicles, and one or both of the ossicles must necessarily have been present. In our statistics, where the ossicles were only obtained from the radical operation, those cases are also counted where one or both ossicles have been destroyed by the suppurating

¹ Ludewig, *Arch. f. Ohrenheilk.*, vols. xxix. and xxx.

process. The same objection holds good for the statistics of Schroeder.¹

To study the site of the disease in various ossicles, we have made use of all available ossicles, whether obtained by the radical operation or by ossiculectomy. The results show that, coinciding with what Schwartz emphasized at the meeting of German naturalists in 1896, the hammer was usually affected in the region of the head and the manubrium, and the anvil in the region of the long process.

The four anchyloses of the hammer and anvil presented the same shape. The hammer was healthy in one case; in one the handle was slightly shortened; and in two the anterior surface of the head and neck was somewhat eroded. The short process of the anvil in all cases was shortened and the long process was wanting, so that the ossicle was transformed into a pear-shaped body. The formation of osteophytes in addition to erosion was present in 5 among 126 cases, once in the anvil and four times in the hammer. In two cases the osteophytes were situated at the margin of the articular surface of the hammer. A destruction localized to the articular surface was not present, agreeing with the findings of Schwartz, Grunert, and Ludewig.

Finally, I want to give the situation of the disease in the ossicles where the erosion was at the beginning limited to a circumscribed area.

In 35 hammers the commencement of the disease was situated: in an area on the anterior surface of the head, 3 times; in an area directly over the crest of the neck, 3 times; at the end of the manubrium, 21 times; in an area on the posterior surface of the head, 3 times; directly at the angle between the head and the neck, 2 times; directly above the insertion of the tensor, 1 time; in the area anterior above the long process, 1 time; at the anterior lateral aspect of the short process, 1 time.

Of 15 anvils the disease began: at the end of the long process, 9 times; at the end of the short process, 3 times; on the medial surface of the body, 2 times; at the base of the long process on the medial side, 2 times.

¹ Schroeder, *Arch. f. Ohrenheilk.*, vol. lxi.

ON THE CAUSATION AND PREVENTION OF BONE NECROSIS IN THE COURSE OF CHRONIC PURULENT OTITIS.

BY DR. A. SCHEIBE, MUNICH.

Translated by Dr. ARNOLD KNAPP.

ON studying the proportion of cases of chronic purulent otitis which lead to necrosis of bone, we find that most authors, like Schwartz, Steinbruegge, Habermann, and others, confound the necrotic and the simple inflammatory processes in bone, and discuss them under the common title, "Caries and Necrosis." These are produced partly by general causes,—constitutional taint and acute infectious diseases,—and partly by local conditions, such as retention and putrefaction of pus (Schwartz), and retention by polypi or cholesteatoma (Habermann). It is not possible to judge in what degree these causes are responsible for the osteitis on one hand and for the necrosis on the other. The question is also made difficult from the fact that most authors, with the exception of Politzer, do not separate bone diseases occurring in the course of acute from those occurring in the course of chronic purulent otitis, although they are entirely different, especially in regard to their etiology.

Bezold was the first to insist upon the separation of the simple inflammatory from the necrotic bone-process, and drew attention to the difference in the anatomical and clinical picture. Necrosis, according to him, was the reaction of the diseased and weakened general system as opposed to osteitis as a reaction of the healthy organism.

Necrosis can follow all general diseases which have depreciated the health of the organism, as well as follow a simple empyema. On the other hand, necrosis may be the result of exclusively local acting causes, such as processes of putrefaction, detachment of the external periosteum and of the dura, as well as the accumulation of epidermis in the middle-ear cavities.

Recently Koerner, in his book on *The Purulent Diseases of the Temporal Bone*, has sharply separated necrosis from the carious processes. He, however, only discusses necrosis in the course of acute purulent otitis. Agreeing with Bezold, he concludes that necrosis in the course of an acute suppuration generally occurs in constitutional diseases, though its appearance in the healthy organism cannot be entirely excluded. The necrosing process in the chronic cases is not discussed at all.

In 1892, I separated necrosis from osteitis, and discussed the etiology of necrosis in acute purulent otitis on a basis of 4 cases. In these 4 patients the bodily condition was a weakened one as opposed to the simple empyemata. I shall return to the bacteriological conditions found present in these cases.

The investigation of necrosis in the course of acute purulent otitis was continued, and I reported upon my results at the meeting of the German otologists in 1900. This new series consisted of 13 cases of necrosis occurring in the course of acute purulent otitis, which I had especially examined for the cause of necrosis in each case.

In all of these cases there were symptoms of severe general disturbance. These in order of frequency were: pulmonary tuberculosis, pyæmia, and sinus phlebitis, diabetes, influenza, and scarlet-fever. In the healthy organism, the acute suppurative otitis had not led to a destruction of bone in a single case.

The pus was examined bacteriologically. The streptococcus was generally found, and the diplococcus pneumoniae was present in only one. If we compare this result with the bacteriological examination of all acute purulent otitides, where the streptococcus and the diplococcus, as is well

these 25 cases, necrosis was present in 16 (64 %), a number which describes the great importance of necrosis for the transmission of chronic purulent otitis to the interior of the skull.

In 3 cases, the middle-ear suppuration was in no connection with death, and in these cases the inflammation was not of a necrotic character.

In 6 cases, it was uncertain whether the endocranial complication was due to the chronic middle-ear suppuration. In these 6 cases the bone was necrotic in 1.

Of the remaining 17 cases suited for this investigation, 16 were taken from the dispensary and 1 from the private practice of Professor Bezold, a condition which is explained by the fact that disregard of the otorrhœa is an important factor in the production of necrosis.

I first want to specify what cases I regard as necrosis. As the bone substance, the periosteum, and the medulla are uniform structures, I have considered under necrosis not only the cases with the formation of sequestra, but those where the bone was exposed and discolored but still in connection with healthy bone. If this condition occurs in the interior of the middle-ear cavities, the periosteum is always necrotic, the medullary substance is decayed to a varying depth, and if the process continues a sequestrum is formed.

If we wish to describe this anatomical picture by a special name, then caries necrotica is the most suitable. Unfortunately the word "caries" is generally regarded as a simple inflammatory softening process of the bone in acute otitis which has nothing to do with necrosis, so in order to avoid being misunderstood I shall not make use of the word "caries" and consider the above cases as illustrating the first stage of necrosis, while the second stage is described by the formation of sequestra. These two stages are frequently found conjointly in the same case, and clinically we frequently observe how the exposed bone gradually becomes detached in the form of a sequestrum, unless under changed and improved conditions the exposed bone recovers and becomes covered with the soft parts.

We must therefore search for the cause of the necrosis in chronic non-specific purulent otitis exclusively in local conditions. We find that of the 17 cases, 16 were complicated with cholesteatoma of the upper middle-ear cavities. It therefore seems that necrosis is usually associated with cholesteatoma, and is not to be feared in chronic middle-ear suppurations without cholesteatoma. The putrefaction of pus is not a less important cause, as the discharge in 16 out of 17 cases was fetid.

It would seem that cholesteatoma only produces necrosis when the pus is fetid. If the pus is without odor, the presence of necrosis is not possible whether cholesteatoma be present or not. Clinical experience shows that the discharge in most of the cases of cholesteatoma is fetid. If, however, only a small proportion of these is complicated with necrosis, we must search for an additional cause. This is, as our series of cases shows, to be found in the retention of pus. In all of the 17 cases, a retention of pus in the middle-ear cavities could be demonstrated. The retention was caused by cholesteatomatous masses 12 times and by polypi 5 times. The cholesteatomatous masses occupied:

The canal, tympanum, aditus, and antrum in . . .	3 cases.
The tympanum, aditus, and antrum in . . .	2 "
The tympanum, aditus, and anterior part of the	
antrum in	1 case.
The aditus and antrum in	3 cases.
The antrum (pus under pressure) in	1 case.
Cholesteatomatous masses were removed from	
both with the tympanic canula in . . .	1 "
Cholesteatoma was removed from the other	
side fourteen days before death in . . .	1 "

In these 12 cases, the cholesteatomatous masses were apparently large enough to cause a retention of pus. In 5 of these there was no other cause for retention. In the other 7, the hypertrophies in the canal and in the tympanum were large enough in only 4 to cause any retention. In the 4 remaining cases of cholesteatoma where the cholesteatoma was not large enough to cause retention, polypi and granula-

tions were present. The granulations in these 4 cases occluded

the entire canal in	1
the bony canal in	1
the aditus in	1
granulating masses were noted in	
the aditus and antrum in . . .	1

There remains a single case of necrosis where no cholesteatoma was present. It is not likely that its presence was overlooked, because every case of chronic suppuration is carefully examined in this regard, and in doubtful cases recourse is had to the microscope. This case was a peculiar one of chronic middle-ear suppuration with the formation of polypi in a bleeder. The excessive hemorrhage which occurred after removal of the polypi was only controlled by packing the canal. This was immediately followed by severe symptoms, and death ensued in four days from sinus thrombosis and meningitis.

In my practice, I have observed 852 cases of chronic purulent otitis. In 20, the bone was found exposed or a sequestrum was present; 10 of these were tuberculous and 1 syphilitic, and 1 was complicated with carcinoma. These are, therefore, to be disregarded. In one case of perforation through Shrapnell's membrane the probe apparently detected a small area of exposed bone, but this is uncertain as the suppuration ceased after four days. There remain 7 cases of necrosis. This number shows that in patients of the better classes necrosis in the course of chronic purulent otitis is a rare feature. It seems that in private practice necrosis following chronic suppuration is less frequent than after acute suppuration. The complications found in these 7 cases were 1 sinus thrombosis and circumscribed meningitis, 2 labyrinthine suppuration, and in the other 4 acute inflammatory symptoms of the external surface of the mastoid. There was no case of death. In 6 of these, the radical operation was performed. The necrosis may be divided in these 7 cases as follows:

Exposed bone in	2
Sequestrum in	5

In 2 of these, the sequestra were complicated with the presence of bare bone.

The site of the necrosis was the mastoid process in 7: namely, the antrum 4 times, twice the anterior and once the external wall of the mastoid process, the tympanum in 2.

In looking for the cause why necrosis occurred in these 7 cases, we find that in only 1 an intracranial complication existed, and that the other patients were healthy. In all 7, cholesteatoma and putrefaction of pus were present. Retention occurred in 6; in the 7th, polypi had been previously extracted. The cause of the retention was cholesteatoma in 1 case and granulations in the other 6. The granulations occluded the depth of the canal in 2, the perforation in the posterior and upper quadrant in 1, the aditus in 2; the polyp had been previously removed in 1.

We saw that in the mild cases in private practice polypi furnish the cause for the retention, while in the fatal cases in the dispensary this cause is furnished by the cholesteatomatous masses; in other words, both can cause retention and necrosis, but retention from polypi does not lead so frequently to intercranial complications as retention from cholesteatoma. This may be due to the fact that in each cholesteatoma we find the bony walls of the middle-ear frequently rarified or defective.

It is also noticeable that the second stage of the necrosis occurs more frequently in the mild cases of private practice than in the fatal cases of the dispensary, where the first stage is more frequent.

Our results may be stated as follows :

1. Necrosis in chronic non-specific middle-ear suppurations are exclusively of a local nature. The suppuration only acts in a necrotic manner when pus is retained and putrefies.

2. This condition generally occurs only when the middle-ear suppuration is complicated by cholesteatoma.

It is possible for necrosis to have occasionally another cause. In one patient that I observed, the death of the bone followed the use of carbolic acid. The detachment of the external periosteum and the dura, which is regarded by Bezold as one of the likely causes of necrosis, did not occur

private practice all came to us after the onset of the acute inflammatory symptoms. Only 3 of these 23 cases had received any treatment before coming to us. One of these had been treated for 3 months with repeated removals of granulations and irrigations. The second was treated for 13 months with packing, and in the third an attempt had been made to open the antrum, the autopsy, however, showing that the operative canal led directly into the posterior cranial fossa.

We may therefore state that in chronic purulent otitis, with the exception of the tuberculous and the syphilitic, the appearance of necrosis can be prevented with certainty by proper treatment.

The following case of hysterical affection of the ear also presented the symptom just described: the integrity of unconscious perception of musical sounds notwithstanding complete functional deafness. In this case, however, the affection of hearing was but one of the symptoms of an absolute sensitive-sensorial hemianæsthesia.

A. K., twenty-one years old, farmhand, always healthy; grandmother on maternal side showed insanity. Parents', brothers', and sisters' history negative.

June 14, 1901, he attempted to dive, while taking instruction in swimming. He was not afraid of the water, as he had been bathing quite often in former years. However, a few hours after bathing he claims that a little blood oozed from the left ear, and that on the following day he experienced difficulty in hearing. As a result, two days later he applied for treatment.

Status Præsens.—Well built, healthy-looking man; normal temperature; heart and lungs normal; no sign of any injury to either ear; left mastoid tip markedly sensitive to pressure, but without any inflammatory changes in the integument or glands of this region. Ear canals dry, tympanic membranes quite normal, showing no sign of any recent inflammation; a minute, old cicatrix visible in posterior-inferior quadrant of left tympanic membrane. Turbinals of both sides moderately swollen; choanæ normal; pharyngeal tonsil present, but does not extend beyond the superior border of upper choanal margin.

Functional examination: whispered voice not heard on either side, ordinary voice only near right ear.

Tuning-fork not heard by bone conduction on either side; air conduction on right side only; inflation produces no change.

States that immediately after diving he had tinnitus lasting two days. Sensitiveness of the integument of left external auditory canal and left drum membrane not altered. Entire left half of body hyperæsthetic, points being described as blunt; skin and tendon reflexes (patellar, plantar, abdominal, and cremasteric) normal.

No tremor of eyelid. Complains of pain in lower region of sternum.

While patient is quietly lying in bed, one observes frequent convulsive movements in different groups of muscles, in the right pectoralis major, and especially in the abdominal muscles during and generally at the end of expiration.

as the patient had dived intentionally, fright can play any factor, though there may have been an excitement. The few drops of blood which were in his left ear after a few hours very likely were an exciting cause to make him imagine that the hearing was impaired; the following day difficulty in hearing on the side on which the slight amount of blood was, the mastoid process of same side being extremely tender, pressure, although there was no apparent sign of a trace of an inflammatory process.

The following day the patient was absolutely deaf in the left ear, and had marked difficulty in hearing in the right ear; during the following days, a complete sensitive hemianæsthesia developed on the left side of the body, notwithstanding the absolute sensory paralysis, a hyperæsthesia of the mastoid region existed. The impairment of the right ear is remarkable, though the other nerves of the right half of the body show no change until months later, a hyperæsthesia seemed to develop in the right conjunctiva and cornea.

This progressive course of the disease renders the prognosis unfavorable.

ON A NEW SYMPTOM OF HEMOGLOBINURIA: CYANOSIS AND GANGRENE OF THE EXTERNAL EAR.

BY THE LATE DR. F. ROHRER (ZURICH).

(*With one plate from Vol. XXXIX., Zeitschrift für Ohrenheilkunde.*)

Translated by Dr. ARNOLD KNAPP.

On October 12, 1899, a man, thirty-two years old, consulted me on account of his ear. The hearing in the left ear had been diminished for six years as a result of a purulent otitis, which had healed promptly. There was occasional tinnitus in that ear. A sister of the patient also suffered from an aural affection. The patient is a well-nourished man who has suffered from acute rheumatism and gonorrhœa. He is a moderate smoker and drinker. No headache, no vertigo, no increased arterial pressure. After severe exertion and exposure to cold six weeks ago, both auricles became discolored, showing a bluish discoloration quite similar to congelation.

Both auricles show a bluish discoloration which is most prominent at the helix margin and in the region of the auricular fold. The shape of the auricle resembles the general type of the pithecus-ear. On both sides there is a supernumerary third crus antihelix in the direction of the Darwinian tubercle, as well as a reduplication of the antihelix in the upper margin of the concha.

Hearing was normal on the right side. On the left, whisper was heard in $2\frac{1}{2}m$; conversation in $5m$. Weber to the left. Rinne, left negative. Both drum membranes are diffusely clouded and retracted, especially left, with a pronounced depression about the umbo. The membrane and the malleus are movable. The Eustachian tubes are somewhat stenosed. The urine contains albumen and blood pigment. A tonic was prescribed. Rest, diet,

and warm salt baths advised. This course of treatment was continued without any result and on November 9th the patient was turned. The cyanosis of the auricle was more pronounced. The left margin of the helix in the neighborhood of the tubercle there was superficial gangrene, 1 cm in extent from the navicular fossa to the posterior margin. The gangrene was dark bluish-black and presented a number of prolongations. Hearing for whisper $2\frac{1}{4}$ to 3 m. His gait was somewhat disturbed. The hemoglobinuria and the patient entered the service of Professor Eichhorn at the Medical Clinic. The subsequent course was very favorable. At the end of January all the symptoms had disappeared, especially those of the auricle. The superficial gangrene at the helix had healed with a scarcely perceptible scar.

This symptom has not been reported in otology literature. An excellent description of hemoglobinuria by Senator in Eulenburg's *Encyclopædia*, vol. ix., states that Hemoglobinuria consists in the excretion of blood in the urine with absence or occasional presence of red cells. The blood pigment occurs principally as methemoglobin. The urine has a red, a brownish-red, or even black color and resembles varnish. The presence of blood pigment is shown:

1. By the spectroscope. The lines of oxyhemoglobin between the Fraunhofer's lines D and E in yellowish green.
2. By Heller's test. Boiling with concentrated hydrochloric acid.
3. By test for hemin crystals according to Reichle, a micro-chemical.
4. By guaiac test — tincture of guaiac and old olive oil, *aa*.

Hemoglobinuria is most frequently observed after venous injection, intoxication, extensive burns, and infectious diseases. A peculiar form is the intermetastatic paroxysmal variety, which was first described by L. in 1854. This begins with a rigor and temperature elevation, more, shooting pains in the back extending into the limbs, followed by cyanotic discoloration of the face

feet, and ears. The causes are exposure to cold, severe muscular exertion, malaria, excesses, syphilis, and heredity. Men are more frequently affected than women. Prognosis uncertain. Hemoglobinuria occurs in various forms in animals, especially in horses. Many cases of hemoglobinuria have been reported, especially in the English and American press. I have, however, only found one observation which coincides with mine, but does not exceed it in severity or extent of symptoms. This was a case published by Wilkes in the *Medical Times and Gazette* in 1879, ii., p. 207.

A boy, sixteen years of age, suffered from a large abscess of the hip joint after an injury. Cyanosis in the face, in both cheeks, and the root of the nose set in. This was followed by a beginning gangrene at the margin of both ears, which assumed a livid color. The toes became livid and painful. All of the fingers of the right hand, and fourth and fifth of the left hand became gangrenous and mortified and were cast off. The toes and tip of the nose and the ears, which were threatened with gangrene, recovered. A defect in the margin of the ears did not occur.

These observations show that, with the appearance of lividity and cyanosis, hemoglobinuria should be suspected and an analysis of the urine be made.

I. Befund 12. X. 99.



II. Befund 9. XI. 99.



DE. F. ROHRER, PINXIT.





passed forward and upward. Pus liberated when the dressings were changed, gradually diminishing. After evacuation of the second abscess, fluid, apparently ventricular, escaped before the pus at each dressing. This gradually diminished, but continued longer than the pus. Three days after the wound closed, pain was felt on the left side of the head, directly opposite the seat of the operation. The wound was again opened, and a director inserted 5cm inward, which liberated two drams of ventricular fluid. Symptoms ceased and the wound closed.

Dr. HERMAN KNAPP : A case of mastoiditis, with features of osteomyelitis ; extension to the occipital bone ; disseminate abscesses in the bones and under the deep muscles of the neck. Two operations without encroaching upon the tympanic structures. Complete recovery. Hearing unimpaired. (Author's abstract.)

The patient, a frail, pale woman, thirty-four years old, in the eighth month of pregnancy, presented herself September 20, 1902, with pain in mastoid region during the last three weeks, of late accompanied by headache, nausea, and insomnia. Never has had earache nor otorrhœa. Whispering voice $\frac{3}{8}$, on both sides. Ear canal wide, membrana tympani normal, Shrapnell red and bulging. Mastoid process enlarged, dull red, hard, tender, and doughy in posterior part, the adjacent suboccipital region painful. She said she had fever at night and also chills.

Operation.—Antrum contained pus and soft granulations. Scattered through the hard mastoid there were a number of small abscesses communicating with one another by very narrow passages. Bone in tip and posterior border softer, brittle, with loose decaying particles. Curetting exposed a cavity, at the bottom of which the sigmoid sinus lay bare 3cm in length, and above the healthy dura mater of the middle cranial fossa. This large cavity was carefully cleansed with the sharp spoon, and then plugged with iodoform gauze and absorbent cotton. No reaction until the eleventh day, when the dressing was changed. Wound in good condition ; lighter dressing with sterilized gauze, to be changed daily. Temperature varied between 97.4° F. and 100° F. The operation and treatment had no influence on the pregnancy. Patient left hospital October 18th for out-door treatment. She came again October 23d, feeling well, temperature normal, but the dressing was impregnated with purulent secretion. Pressure be-

Among the *remarks*, Dr. K. states that the infection travelled through the tube, tympanum, and aditus into the mastoid; the only trace of this path was shown by redness and slight swelling of Shrapnell's membrane, though the case at first sight appeared as a primary mastoiditis.

The mastoid process was hard, swollen, with purulent foci in the antrum and in small deposits scattered through the dense vascular portion of the diploic bone between the antrum and tip; the decaying tip and posterior border of the mastoid process and the caries of the occipital bone might well suggest the diagnosis: acute osteomyelitis, yet more could not be said than that it might be correct. The case is one of a group of which the speaker has seen a certain number, almost facsimile of the case under consideration.

As to treatment, the case seemed to strengthen the correctness of those who advise to remove the whole mastoid in every purulent mastoiditis. The author would not go so far, but be conservative, *i. e.*, give free vent to the pus and remove all carious or necrosed bone.

Fistulas and recesses should be carefully explored; they get well by free vent of the secretion, but no earlier than the pyogenic factor, mostly a piece of carious bone, is removed.

Dr. E. GRUENING, New York : A case of **abscess of the right cerebellar hemisphere, with caries of the left mastoid process.**

Slowing of the pulse, drowsiness, vomiting, and rapidly developed optic neuritis were the symptoms pointing to the presence of cerebellar abscess. Both ears were affected. Acute inflammation of the right ear which rapidly subsided. Left ear more seriously affected. Mastoid cells were filled with pus and broken-down bone. For this reason the left temporo-sphenoidal lobe and the left cerebellar hemisphere were aspirated. Results negative. Post-mortem showed a large abscess of the right cerebellar hemisphere.

Abscess of the left temporo-sphenoidal lobe. Operation and recovery.

The symptoms leading to the diagnosis were rapid development of choked disk, slow pulse rate, intense headache, and vomiting. Amnesic aphasia was absent before the operation but appeared immediately after. The discharge of pus from the

abscess was followed by clear, apparently ventral. Rapid recovery.

Discussion.—Dr. DENCH mentioned a case having symptoms pointing to cerebellar abscess. After operation rise of temperature appeared. The patient died before operation could be performed. A cerebellar abscess on autopsy lying just below and internal to the lateral sinus.

Dr. RICHARDSON mentioned a case where the cerebellum was opened, but the convalescence did not progress; the patient dying. At autopsy, the abscess of the cerebellum was found.

Dr. TANSLEY stated that in cerebellar abscesses the patient continually turns his eyes away from the seat of lesion.

Dr. RANDALL noticed a nystagmic tendency in which seemed usually to be toward the affected side, the only symptom.

Dr. GRUENING prefers to use gauze where drainage is necessary.

Dr. WHITING recommends his encephaloscope in the treatment of these abscesses.

Dr. EDWARD BRADFORD DENCH: A case of thrombosis of the internal jugular vein. Serous meningitis. Mastoidectomy. Death. Autopsy.

Patient eight years old. Acute inflammation of right ear. Stiff neck. Tenderness over mastoid process. Paracentesis did not remove the symptoms, neck became stiff. Swelling below and above tip of mastoid. In operation. Mastoid was opened and contained contents in the tip and cells; the antrum appeared to be normal. appeared to be in immediate contact with the lateral sinus. firm clot was found occluding the sinus. Circulation restored with curette above but not below. Jugular vein was opened from the omohyoid to the base of the skull. The pain subsided. Convalescence favorable, but later the extremities of the right arm broke down and pus was found. Pulse 42, and patient bad. Child stupid. Optic neuritis both sides, more marked on the right. Further examination showed vision normal. Catalepsy of upper and lower extremities. Opening made backward from seat of previous operation. Cerebellar dura uncovered. No pus was found. A catheter was followed by flow of serum. The cerebellum was

the dura much congested. Profuse discharge of serum through the dressings. Hernia was removed at each dressing. Patient died on the tenth day.

Autopsy.—At least two-thirds of the right cerebellar lobe was found destroyed. Base of skull normal. Cause of death hemorrhage into spinal canal.

Dr. FRED WHITING, New York: **The differential diagnosis of acute and chronic brain abscesses by means of the encephaloscope.**

Dr. Whiting recommends the use of gauze for drainage in preference to decalcified turkey-bone used by Macewen. Dr. Whiting's encephaloscope makes possible the differentiation of acute and chronic brain abscesses. The appearance of the walls of the abscess cavity in acute purulent encephalitis is not unlike that of some space lined with delicate mucous membrane, the color of the surfaces under inspection varying from pale pink to a more pronounced reddish hue in proportion to the degree of inflammation whether of moderate or of greater severity. Upon this pinkish wall will be seen secreted here and there shreds of plastic lymph which nowhere assume the proportions of an investing layer, and punctured here and there with hemorrhagic spots of greater or less size, but one does not detect at the time of operation, or until several days later, the presence of granulations upon the walls of the abscess cavity. With chronic purulent encephalitis the picture which the encephaloscope discloses is that of dense yellow-white opaque membrane of firm consistency, completely investing walls of cavity. This capsule seldom or never presents a smooth or homogeneous surface, but is irregular, resembling a shrivelled bladder. The thickness and density of the capsule may be considerable—perhaps sufficient to prevent collapse for a time. Granulations are sometimes seen on the inner surface of the wall, or they may be absent. Bleeding is common from newly formed blood-vessels. The granulations are seen bright red, springing from the healthy brain matter. Unhealthy granulations may appear—dark blue or nearly black. The clinical value of the encephaloscope is: 1. The assistance it affords at the time of operation. 2. Its service in post-operative treatment. It shows positively whether the evacuation of the purulent contents is complete; whether there are plastic bands interfering with drainage; whether the abscess is acute or chronic, which is of great prognostic importance.

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ments. Large numbers of streptococci and a few diplococci and pneumococci were present. Recovery took place in four weeks without complication, although the temperature did not reach normal until nine days after operation.

The author calls attention to a few points of extreme interest in the onset and development of these two cases.

First, the unusual rapidity with which the mastoid and sinus involvement followed the acute otitis.

Second, that the predominating infection in both cases was due to streptococci.

Third, in both cases there was no chill, only the sensation of cold. Given the other symptoms usually present in these cases, we should not wait for a decided chill before operating, since in many cases chills have not been present at any time during the entire development of the disease.

Fourth, that in the first case there was a continuously high temperature, never falling below 105° F., which is unusual, an irregular temperature with sudden rises and falls being characteristic of a sinus complication. The temperature of the second case was also unusual, in remaining during the six days that the case was under observation at or below 99.8° F. The temperature in this case was very misleading.

Dr. FRANK BULLER, Montreal: Chronic suppurative otitis media, thrombosis of the sigmoid sinus and internal jugular.

Operation on mastoid and sinus. Ligation of the deep jugular, followed by septic pulmonary complications. Death six days after operation.

It was a case of chronic suppuration of the left ear, with intermissions. A recurrence, followed by cessation of discharge, rigor, high temperature, and pain in the top of the head, vomiting, tenderness over the mastoid pronounced toward the tip, swelling beneath the sterno-cleido mastoid, fetid discharge. Double neuroretinitis.

Deep jugular tied and the mastoid opened after closure of the jugular wound. A softened area led to the sinus, which contained a clot. This was removed and the sinus cleaned with formalin solution. The patient recovered well, but had a chill on the following day. Chills for several days. On the fourth day, when the dressing was removed, there was a slight odor. Some cough.

Dulness at the base of the right lung, and friction sounds at the right base. Tenth day—wound fairly healthy. On the thirteenth day, a considerable abscess had formed at the point of ligation of the jugular vein. On the twenty-first day, spasms of the right arm and hand, also of the left arm. Eyeballs were drawn strongly upward, turning to the right; soon followed by general convulsions. Patient in stupor for the next twenty-four hours—but there was no paralysis. Gradual recovery of the mental functions. On the thirty-second day, the patient had rigors, recurring daily. Cough and pains in the chest, specially of the right side. The operative wound healed slowly, but there was a cure of the original lesion, nor were there any indications of intracranial disease. On the fifty-ninth day, aspiration of the chest removed pus. The chest was opened. Patient died. No post-mortem.

Discussion.—Dr. SPRAGUE mentioned a case in which meningitis developed after a satisfactory mastoid operation. Cause not known.

Dr. BACON stated that ligation of the jugular vein did not cut off all means of infection, and that death had occurred from sepsis after the most extensive radical operations.

Dr. THOMAS R. POOLEY: A case of mastoiditis, sinus thrombosis, pyæmia. Two operations. Recovery.

Patient taken ill with grippe. Had spontaneous rupture of the drum membrane. Had marked pain and tenderness, distinct redness and swelling in the mastoid region. Streptococci found in discharge. Patient's appearance showed profound infection. Schwartze incision was made. The outer table was found softened. Sinus was opened in its abnormally forward course. The ascending portion of the sinus was exposed for nearly its entire length. The wound found sloughy on the fifth day. On seventh day, patient complained of pain from tonsillitis and headache, and there was distinct redness and tenderness in the course of the jugular vein. On the eighth day, painful arthritis in the middle finger of the left hand developed, and the wound was gangrenous. Temperature 103° F. On the ninth day, pulse 120. Later, severe chill. Temperature rising. Pulse 130; respiration 36. Choked disk in both eyes. Diagnosis of septic thrombosis. Operation next day. The original wound was opened and the sinus exposed still farther. It was slit open and found filled with a fibrous clot. Lower down there was a disorganized clot.

Circulation was restored by forcible manipulation and curetting of the jugular vein. The patient being almost moribund, it was thought best not to open the neck farther. Symptoms of infection continued. Various signs of localized metastatic infection appeared. Gradual recovery. A sequestrum formed on the exposed bone on the eighty-third day, and more sequestra appeared later.

Dr. H. O. REIK, Baltimore: The effects of increased intratympanic pressure. A possible explanation of tinnitus aurium. (Author's abstract.)

Dr. Reik called attention to the paper which he presented before the American Otological Society, at its last annual meeting, setting forth some physiological experiments to show the cardiac and vascular effects of operations upon the middle ear. These experiments tended to show that operations upon the membrane or ossicles always produced a depressive effect, and that the lowering of blood pressure and pulse rate was in direct proportion to the amount of traumatism. This fall of blood pressure immediately following injury to the tympanum was shown to be due to disturbance of the vasomotor apparatus and to account in a satisfactory way for the cardiac depression that so often accompanies operations upon the middle ear,—phenomena that had been erroneously attributed to disturbed equilibrium due to increased intralabyrinthine pressure.

Dr. Reik presented some new physiological work to show the effect of increased intratympanic pressure as measured by changes in the pulse rate and blood pressure. Dogs were used for the experiment, the blood pressure and pulse recorded by the kymographion and the intratympanic pressure measured accurately by a mercury manometer. It was found that even a slight pressure of fluid in the tympanum caused a depressor effect, and that the extent of fall in the blood pressure and pulse rate and also the duration of this effect were in direct proportion to the amount of pressure exerted upon the fluid in the tympanum.

Attention was called to the old theory that tinnitus aurium constituted an appreciation of sounds attending the circulation, and argument was adduced to show that these sounds might be due to the changes in the circulation produced by disturbances in the vasomotor apparatus. The hypothesis is an old one, but heretofore no positive evidence has been submitted to substantiate it.

Dr. Reik's experiments seem to show that changes in the calibre of the blood-vessels of the tympanum or labyrinth do occur as the result of even slight irritation of the tympanic membrane, or within the middle ear.

Dr. GORHAM BACON, New York: A case of double acute mastoiditis followed by sinus thrombosis and other complications; operation; recovery. (Author's abstract.)

The patient, Clara K., married, twenty-four years old, was admitted to the N. Y. Eye and Ear Infirmary on April 2, 1901. One week ago, she had an earache (left side) following an attack of grippe. She had violent pain with tinnitus, and two days later the right ear began to pain her more severely than the left one. On the following day the ear began to discharge, and later the same occurred on the left side.

When examined on admission, there was a profuse discharge from each ear, with bulging of both drumheads and mastoid inflammation, requiring immediate operation. For several days she has been very deaf, has suffered from nausea and vertigo, and recently has vomited. She denies having had any fever or chills. The tenderness on pressure was more marked on the right than on the left mastoid process. Temperature $99\frac{1}{2}^{\circ}$ F.; pulse 102.

The operation was performed immediately and as rapidly as possible, owing to the fact that she expected to be confined in about six weeks. The right mastoid process was opened first and pus and necrosed bone were removed. The left mastoid was then opened and found to be in a similar condition, although the disease was not so severe on this side. The pus from the right side showed marked streptococcus infection. No streptococci found on the left side. The entire cellular structures were removed on both sides and the wounds dressed in the usual way.

The patient did very well until three days later, when she had a severe chill, followed by a temperature of 106.5° F. (rectal) and sweating. She was nauseated and vomited. There was no tenderness along the course of the internal jugular vein on either side.

The right sigmoid sinus was opened and a firm clot removed. The blood current was re-established from the upper end but not from the lower or bulbar end. The internal jugular vein was not ligated. Under the microscope the clot contained streptococci.

The patient's condition was good and she was removed to the ward. An hour later she had a chill and temperature of 105° F.,

followed by sweating. The temperature gradually fell to 101° F. at midnight. The next day the temperature was $99\frac{1}{4}^{\circ}$ F. in the morning, and $101\frac{3}{4}^{\circ}$ F. in the evening. Three days later the temperature was normal. On April 15th, at 10.45 A.M., an eight-month child was born after thirteen hours of labor. All went well until April 20th, when she developed a temperature of 103° F. This was due to an abscess in the right gluteal region, which was opened and the temperature again became normal. Later an abscess formed in the left gluteal region and caused a rise in temperature again. The pus in each abscess contained staphylococci. There were no further complications after this and the patient and child left the Infirmary in excellent condition on May 27, 1901.

The case was reported on account of the unusual complications. In the first place, the patient's condition was such that the operation had to be performed as rapidly as possible. When the patient developed sinus thrombosis, there was difficulty in deciding as to whether to operate on one or both sigmoid sinuses. As the right ear alone showed the presence of the streptococcus, it was deemed best to open the right one first and then wait for further symptoms. The second chill seemed to be due to septic absorption, which had already occurred, and not to involvement of the left sinus.

The internal jugular vein was not excised, because the writer does not consider it good surgery to ligate the vein in recent cases, especially when the clot has not broken down and there is no tenderness along the course of the internal jugular vein. He prefers to wait twenty-four hours before ligating the vein, even when the blood current has not been re-established from the bulbar end. For the successful result in this case, the writer is indebted to the skill and judgment shown by the House Surgeon, Dr. J. D. Richards.

DR. B. ALEX. RANDALL, Philadelphia: A study of the surgical relations of the facial canal in five hundred crania.
(Author's abstract.)

Dr. Randall expanded a preliminary paper published in the ARCHIVES OF OTOTOLOGY and presented the results of measurements of 500 skulls as to the vertical course of the descending portion of the facial canal. This was found in sixty per cent. of all cases, irrespective of age, cranial index, asymmetry of the jugular bulb,

or inclination of the axis of the external meatus. Outward course of the facial was present in one juvenile skull to the extent of 10° and to trivial degrees in a small percentage, while an inward deviation from 5° to 15° was twice as common. Symmetry, of course, was almost invariable, and an apparently outward course was at times due to the encroaching of the paramastoid process upon the stylo-mastoid exit. The facial canal was in no case found to be less than 2 or more than 4mm back of the middle of the back margin of the annulus, and in every case the lower edge of the annulus lay 3 to 4mm internal to the corresponding level of the facial canal.

Dr. GEORGE B. MCAULIFFE: A few aural suggestions.

Removal of exostoses of the external auditory canal is generally accomplished by chisel and mallet, with disengagement of the auricle from the bone. I removed several by means of a hook caught behind the growths. Occluding exostoses, although not always manifestly pedunculated, are capable of some motion, and after their removal show that they are not, after all, sessile. I was induced to try this by the hurry of one patient, and by the occurrence of an epileptic fit at the outset of anæsthesia in a patient on whom the chisel, mallet, and laying forward of the auricle were to be employed. It is a minor surgical procedure practically painless.

The cutting away of the external wall of the aditus is the most delicate step in the tympano-mastoid exenteration. Randall's method is good. I have used Gigli's wire saw to cut away the bridge of bone.

Post-mastoidectomy temperature is septic, owing to neglected foci in zygomatic, tip, or occipital cells or absorption during operation. The most radical operations are generally most afebrile. To effect afebrility, all blood clots must be removed, after all septic cells are removed, and the wound flushed with hydrozone and alcohol. Into the dry wound the primary dressing may be retained as long as eight or ten days without symptoms.

Earaches generally occur at night, because dorsal decubitus upsets the best aural circulatory balance, and because the pharyngeal orifice of the tube, which lies an inch below the tympanum in the erect posture, and therefore has gravity to aid its protection of the middle ear, lies above the tympanic in the reclining position. Best position, then, for the aural inflammation is the semi-

reclining, with the helix of the affected ear uppermost to get downward and forward drainage.

Javanese method of pressure on the carotids is useful to induce anæmia of the brain and cause an absence of perception of the sensorium of peripheral sensation. The feeling when the method is rightly used is similar to aconitia, followed by loss of motion and pain. Transitory as it is, one can cut the drum before the patient is aware of it. Adventitious bands are often found binding the median cartilaginous plate of the Eustachian tube to the pharynx. Their removal often relieves the tinnitus and deafness more than any one procedure. The finger passed down the fossa of Rosenmüller accomplishes their removal.

Discussion.—Dr. RANDALL suggests that children with earache should go to bed with flannel night-caps, and that cases of eruptive fevers should wear night-caps by day and night as a prophylactic and therapeutic measure.

Dr. WM. SOHIER BRYANT, New York: Report of case of **fibroma of the external auditory canal, with serious reflex symptoms.**

The tumor was cylindrical, lying subcutaneously, and was keloid in character. Nervous symptoms were attributable to outward displacement of the drum membrane due to absorption of air in the auditory canal.

Dr. FREDERICK L. JACK, Boston, Mass.: **A mastoid and auricle retractor.**

Dr. Jack exhibited a self-retaining retractor for holding the two edges of the wound apart, with adjustable plate to hold the auricle out of the way.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

MEETING OF OCTOBER 10, 1903. THE PRESIDENT, E. B. DENCH, M.D.,
IN THE CHAIR.

Dr. ARNOLD KNAPP presented a case of **exostoses** in the depth of both **auditory canals** complicated by **chronic purulent otitis** on one side, which had necessitated the **radical operation**, in a man twenty-nine years of age. The purulent otitis was of nine months' duration; the patient suffered from headache and nausea, and was unable to work. The exostoses were situated on the anterior and posterior walls of the auditory canals in the extreme depth; the lumen was contracted to a narrow vertical chink, which, in the right ear, was filled with pus. Hearing $R = \frac{1}{8}$, $L = n$.

Operation, January 14, 1903.—The auricle and the membranous canal were retracted, exposing the exostoses. These were removed, and were found to be in contact with the drum membrane.

The lower half of the drum membrane was destroyed. There were granulations in the middle ear. It was decided to do the radical operation for fear of not being able to prevent a stenosis of the canal. The antrum was found practically normal. The lower and posterior recesses of the tympanum were filled with granulations. The body of the incus was carious; hammer normal; Koerner's plastic; immediate skin graft. The subsequent healing was rapid. The graft had taken so that after the first dressing no further introduction of gauze was found necessary. The ear, however, was not completely dry until ten weeks after the operation, owing to granulations and moisture at the inner extremity of the anterior meatal wall. When last seen, on September 17th, the hearing was $\frac{1}{4}$.

Two points in the case are of interest:

First.—Confirming the obstinacy and length of treatment incurred by necrosis or any lesion of the anterior meatal wall after radical operation.

Second.—That good hearing is possible after the radical operation, and that diminution in hearing depends on the extent of the suppurating process rather than on the operation.

Discussion.—Dr. WENDELL C. PHILLIPS said that he had recently operated upon a similar case. The patient, a man fifty years of age, had had a chronic suppuration for many years. There was also a large exostosis of the posterior wall of the canal which filled more than two-thirds of the lumen. The patient was beginning to complain of pressure symptoms. He had advised the removal of the exostosis and a Stacke operation to be done at the same time, to which the patient consented. After complete operation a large skin graft was introduced and the posterior wound closed. The patient made a favorable recovery. In this case, however, inasmuch as the ossicles had evidently been destroyed for some time and there was no hearing previous to the operation, the subsequent hearing was not improved.

Dr. T. J. HARRIS presented a case of **hemorrhage into the labyrinth**, in a machinist sixty-five years of age, who, upon the ninth day of August, was working upon the new Brooklyn Bridge. He fell a number of feet, striking his head upon the iron platform below him. In addition to severe contusions of the shoulder and other parts of the body, he sustained a fracture of the base of the skull. When he became conscious it was discovered that he had become totally deaf, as he has remained ever since.

There appeared to be no response to all tests in the left ear; in the right ear there was very slight response. The shouted voice employing double numerals could be heard at six inches, and in almost every key there was response to the Galton whistle. He heard the C fork 128 v. for six seconds by aërial conduction, and eight seconds by bone conduction. The tubes were well open. Escape of cerebro-spinal fluid had taken place from the ears, at time of accident, but no lesion of the drum membranes could now be discovered. In addition to the loss of hearing, there were profound vertigo and a good deal of tinnitus. He had four injections of $\frac{1}{4}$ gr. pilocarpin, which had produced physiological effects, and iodide of potash, 50 minims of saturated solution three times a day, with no noticeable change in hearing, but an improvement in the

vertigo. He was also being treated with galvanic current behind both mastoids.

The speaker said that Politzer had reported a number of cases where fracture of the skull existed, and where as a result there had been some internal ear lesion, in a few cases with recovery as far as life was concerned, but rarely with any improvement of hearing.

Discussion.—Dr. C. M. COAKLEY had seen a case with somewhat similar history. A man riding on a truck was thrown backward to the ground, receiving a badly depressed fracture of the skull. He recovered from the wound, but could not hear ordinary sounds; was not totally deaf in either ear. Was put on pilocarpin without benefit. When last seen, in June, complained of tinnitus and dizziness, although the latter trouble was better than it had been.

There had been paralysis of the left facial nerve, which had cleared up before the speaker had seen the patient.

Dr. PHILLIPS said that in his experience the vertigo and tinnitus gradually subsided, but as a general rule there was not very much improvement in the hearing.

Dr. JAMES F. MCKERNON related the history of a man who received a fracture of the base of the skull (left side) while automobiling, by coming in contact with a trolley car. When seen, four days after the accident, a small amount of cerebro-spinal fluid was issuing from both ears. There was a fracture of the palate process of the superior maxilla on the left side. There was also slight facial disturbance on the same side. Two days later, making six days from the time of the accident, he regained consciousness and was put upon pilocarpin hypodermically three times a day, and nitrate of strychnia was also administered. Two weeks from the time of the accident, the hearing was absolutely nil on both sides. Ten days afterward, he could hear the Galton whistle on the right side, but not on the left. The lower tones were entirely absent. Two weeks later, he could hear the Galton whistle on both sides and the 256 fork on the right side.

This treatment was continued for eleven weeks, when the hearing on the left side was four feet for the whisper, and on the right side over fourteen feet. About a year afterward he had entirely recovered his hearing on the right side, and he heard about one-third the normal distance on the left side. Vertigo, which was present, entirely disappeared at the end of the fourth week.

The speaker said he believed that pilocarpin should be given

up to the physiological limit, and over a long period of time in these cases.

The CHAIRMAN, Dr. EDWARD B. DENCH, had seen but few such cases. His single experience with fracture of the base of the skull made him agree with Dr. McKernon, that pilocarpin should be given a long time and to the physiological limit, in order to get good results.

In other cases, where there had undoubtedly been hemorrhage into the labyrinth, fairly good results had been attained in his practice by the administration of pilocarpin.

The paper of the evening, **clinical experiences with the enlarged pharyngeal tonsil**, was then read by the author, HENRY GRADLE, M.D., Chicago, Ill. (See page 422 of this issue.)

Discussion.—Dr. W. F. CHAPPELL said that he would review Dr. Gradle's paper from the standpoint of the rhinologist rather than of the otologist. He thought there was much to be learned about the pharyngeal tonsil, especially regarding the lymphoid tissue as a source of entrance of infection to the general system. He thought that children with unhealthy lymphoid tissue in the naso-pharynx or fauces were more liable to contract diphtheria, influenza, scarlet fever, measles, and whooping-cough than those with a healthy naso-pharynx.

As to pharyngeal hypertrophies, we may have multiple large and small hypertrophies. In one case, drawings of the faucial and pharyngeal tonsils were shown; it was very hard from the size and shape to distinguish between them. Another case of exceedingly large hypertrophy had been presented in Dr. Holt's book. In both cases the growths were apparent below the soft palate. The child, whose faucial and pharyngeal tonsils were reported, weighed twenty pounds when operated upon. Three months later the weight was thirty-four pounds, a gain of fourteen pounds in three months.

In regard to diagnosis of adenoids, three conditions might lead specialists astray: one, a wide naso-pharynx in a large, healthy child, which might contain considerable adenoid tissue without giving evidence of diseased naso-pharynx, and yet present other symptoms. For instance, a boy of ten months when crying began to catch his breath. A little later, he developed severe laryngeal spasms, became cyanosed and unconscious for an appreciable time. A large adenoid was removed, and during the

operation a severe spasm of the larynx occurred. He recovered without further symptoms.

In certain children and young adults, in place of the ordinary large lymphoid mass or masses, one might have a sheet of lymphoid tissue covering the vault of the naso-pharynx. At times this would be perfectly quiet and in apposition with the surrounding tissues; at other times, swell and more or less completely fill the naso-pharynx. Dr. Delavan called attention to this some years ago.

Dr. Chappell said that it was impossible in very young infants to introduce the index finger into the naso-pharynx. They had many symptoms simulating adenoids, making diagnosis difficult. In some cases it was indigestion or curds of milk in the pharynx, or a large tubercle of the process of the atlas might be mistaken for adenoids.

As regards treatment, the speaker believed that, if there was but little adenoid tissue, it would disappear if the child could be placed permanently in a suitable climate, but as a rule these growths called for operation.

As to operation, each man had his favorite instruments, table, anæsthetics, etc. He had used Dr. Gradle's instrument. When the lymphoid masses were large and in a central line, it was very satisfactory.

He thought it very important to take temperature before and after performing adenectomy in children as well as in adults, and in private practice he thought it well to examine the urine. On two occasions had deferred operation on account of albumen in the urine, and within four days both children had scarlet fever. Had watched a child of five months for a few days after operation, and found that it had a temperature of 106°. Had the blood examined and found the plasmodium malarix. Another case developed temperature after the operation, and it was the first symptom which preceded a rapid tubercular infection.

As to results—he thought them most excellent from operations on the naso-pharynx. It was in some rare cases difficult to use instruments in the naso-pharynx, and sometimes small pieces of tissue were left. If the voice was much impaired it would be well, in his opinion, to explain to the parents that the child might require vocal lessons before the voice would be restored. It was also well to examine the nose. There might be posterior hypertrophy, polypi, or deflected septum.

The speaker hoped that others would study the subject of lymphoid tissue as a portal of infection to the general system.

Dr. MCKERNON said deafness often resulted from tubal catarrh, and was many times caused by the impairment of the venous circulation around the cartilaginous portion of the Eustachian tube, due to the presence of lymphoid hypertrophy some distance away from the tubal opening, in contradistinction to its being directly over the tube, as many authorities state.

Congenital pharyngeal hypertrophies were found in fifteen out of forty-three cases in children under two months old, and in these cases the hypertrophy was found in the vault and well developed. He had seen lymphoid tissue well developed in two or three cases three weeks old, which he had removed with the finger to allow the child to breathe.

He had seen only four out of thirty cases during the past five years, where lymphoid tissue was present in cases of cleft palate.

The speaker had seen cases of reflex cough without bronchitis, cold, or coryza. On lying down the patients coughed. He had examined the naso-pharynx, and found lymphoid hypertrophy. On its removal the cough disappeared.

Dr. MCKERNON thought it best in cases of adenoids during an acute otitis, to wait until the otitis diminished before removing the adenoids, then operate under complete anæsthesia of nitrous oxid gas or nitrous oxid combined with ether.

Recurrence of lymphoid hypertrophy of the pharyngeal vault did take place, to the writer's knowledge. One case reported by Dr. Hopkins, had been operated on five times, and the vault left completely clean each time. He thought one cause of recurrence might have been lack of nasal respiration.

The instruments preferred by Dr. McKernon were the Brandegee forceps and the Gottstein or modified Gottstein curette.

Dr. COAKLEY thought the symptoms produced by adenoids were not entirely due to the presence of the growth in the naso-pharynx. It was well to contract the closed passages with cocaine to see whether there was inflammation, thickening, or some growth that might remain and cause obstruction after the removal of the adenoid tissue.

As to diagnosis, he relied upon facial expression, history of mouth-breathing, snoring at night, and the presence of the thick, gelatinous discharge coming down when examining the fauces,

rather than the mirror, or passing the finger up behind the soft palate, which hurt and frightened the child.

In children two to five months old, he put a small curette in the naso-pharynx, going through the motions as if there were adenoids: if found, the operation was ended; if not, there was a faulty formation of the vault of the naso-pharynx which interfered with respiration.

As to instruments, he thought better results could be attained by the use of forceps and the curette afterward. He used Dr. Brandegee's forceps and Löwenberg's curette, under an anæsthetic. He thought Dr. Gradle's instrument might not include all the adenoid tissue, though it made a clean cut.

Dr. PHILLIPS considered the method of examination as of great importance, and for two reasons advised the use of the tongue depressor and mirror: first, because it did not antagonize the child; and secondly, the location and extent of the growth could be better defined. With care he rarely failed to get a satisfactory examination by this method, even in quite young children. He considered it quite possible to make a satisfactory diagnosis from the clinical history, facial appearance, hypertrophied tonsils, and the presence of follicular growths on the posterior walls of the pharynx, and he often operated without further examination.

As to the actual location of adenoids in Rosenmüller's fossa, he had rarely seen them there, although the overhanging masses would seem to be in that location. He did not think that any ear complication resulted from direct pressure upon the Eustachian tube. A large number of his adenoid operations came from patients who first presented themselves, owing to recurring suppuration of the middle ear. There could be no doubt that adenoids exercised a considerable influence upon general nutrition, as might be instanced by the rapid increase in weight after operation. The most marked instance of this kind which had come under his observation was in a boy of fourteen years of age, of stunted growth, who had enormous adenoid development, together with large faucial tonsils and a badly deflected septum as well. After successful operation upon these, the boy gained forty pounds in one year. Of late Dr. Phillips had taken the weight of all adenoid patients previous to operation, so that comparisons might be made. He has also made it a rule to make a rhinoscopic examination some time after the operation,—a procedure which he strongly recommended.

As to instrumentation, he did not believe that any operation without an anæsthetic could always be done thoroughly, no matter what instrument should be used. He had seen Dr. Gradle's instrument some years ago in Chicago. It seemed to present some strong points. The Brandegee forceps, however, had proved so successful in his hands, together with the Gottstein curette, that he should be loath to use any other. With these instruments a complete operation could be accomplished (under an anæsthetic) in a few seconds. The temperature, of course, should be taken before the operation.

Dr. C. E. MUNGER had used Dr. Gradle's instruments for the past two years, and had operated with them one hundred and eighty-five times on adults and small children. He thought they brought out adenoids in their entirety as did no other instrument. The instrument, as made at present, broke easily when sterilized under steam, and should be made stronger. It was used more easily on adults, who co-operated with the operator.

Dr. D. J. McDONALD said that for five years he had given bromid of ethyl as an anæsthetic in adenoid operations over seven hundred times without a death. It was not necessary to have an expert anæsthetizer. An operation could be done in forty seconds under bromid of ethyl.

Dr. BRANDEGEE asked Dr. Gradle whether it was his rule to rely solely upon the instrument shown, without Gottstein's curette, or other instrument.

Dr. GRADLE, in closing the discussion of his paper, said, in response to Dr. Brandegee's question as to the use of Gottstein's curette, that he had practically ceased using it since he relied upon the instrument shown. He had formerly used it, but as by the use of his instrument adenoids could be removed in their entirety he did not consider further procedure necessary.

As to congenital condition, he had not seen it except in very young babies. He had watched the mode of production, and found it to be, distinctly, a form of inflammatory hypertrophy. This had led him to infer that it could not have been congenital or it would have had a different etiology, as a coryza could not occur before birth, but could within the first few weeks of life.

In babies under eight months old, he used a small Hartmann curette for diagnostic purposes, doing what was necessary at the same time. In children one or two years old, he used his own smallest pattern. He considered removal by forceps a cruel

operation. Older children had told him that his operation gave them very little pain when cocain had been used freely.

He knew of no reliable statistics as to ethyl or bromid of ethyl. Hinkle found eighteen deaths in American and English literature, 1892-1898, a proportion appallingly large.

As to hemorrhage, he had discovered that it came from tags. By the use of his instrument, no tags were left, consequently no hemorrhages occurred.

He thought the use of the thermometer wise, but operated under disturbance of temperature rather than defer operation until it became still higher.

REPORT ON THE PROGRESS OF OTOTOLOGY DURING THE FIRST QUARTER OF THE YEAR 1903.

By DR. ARTHUR HARTMANN.

Translated by Dr. ARNOLD KNAPP.

(Continued from page 411.)

GENERAL.

a.—REPORTS AND GENERAL COMMUNICATIONS.

17. **Schmiegelow.** Reports from the oto-laryngological department of the St. Joseph's Hospital, 1902, Copenhagen.

18. **Pick.** Clinical contributions to otology. *Wien. klin. Rundschau*, 1902, No. 32.

19. **New York Eye and Ear Infirmary.** Eighty-second annual report for the year ending Sept. 30, 1902. Aural surgeons: Bacon, Dench, Adams, Whiting, McKernon, and Lewis, Jr.

20. **Manhattan Eye and Ear Hospital.** Thirty-third annual report for the year ending Sept. 30, 1902. Aural surgeons: Webster, Emerson, Lewis, Hepburn, Clemens, Phillips, Berens, Duel.

21. **New York Ophthalmic and Aural Institute.** Thirty-third annual report for the year ending Sept. 30, 1902. Aural surgeons: H. Knapp, A. Knapp, R. Jordan, J. A. Jackson, C. Mund, J. Wolff.

17. 163 patients were treated during the year. Of these, 7 died; 156 operations were performed, of which 20 were simple mastoid operations and 35 radical operations. A review of the treatment in middle-ear suppuration is added. In acute purulent otitis the patients are advised to stay in bed. Of the unusual cases, one is mentioned where the simple operation on the mastoid process revealed a large epidural abscess which had given no symptoms. Another case is described where a carious process in the mastoid continued, though the otitis media was cured. In

chronic suppuration the simple operation was performed 12 times. In the other operations the radical operation was done. In 63 % of the cases of the radical operation, complete healing took place. As regards the healing both before and after the radical operation, 17 cases are quoted, of which in 10 the hearing was improved after the operation, in 3 it was unchanged, and in 4 it was diminished.

MÖLLER.

18. (1) A case of objective perceptible tinnitus due to chorea pharyngis.

A noise was perceived with aid of the auscultation tube at irregular intervals up to 100 times a minute. The cause was chorea-like clonic contractions of the pharyngeal muscles, especially of the soft palate and the Eustachian tubes. The disease is supposed to be the result of extensive changes in the nose and the naso-pharynx.

(2) Spontaneous cure of a chronic purulent otitis media, as after the radical operation.

Removal of a sequestrum with the forceps, representing almost the entire posterior bony auditory wall.

(3) A cyst within the tympanum. A bluish-red soft tumor as large as a bean, in the tympanum. Puncture revealed a small quantity of slightly clouded, yellowish-brown, serous fluid, which contained cholestearin crystals, red blood corpuscles, and cells filled with fat granules.

WANNER.

19. Number of ear patients, 10,235; throat patients, 9607; ear operations, 1674; paracentesis of membrana tympani, 490; ossicectomy, 34; mastoidectomy, 219; Schwartze-Stacke, 37; cerebral abscess, 4; epidural abscess, 36; sigmoid sinus thrombosis, 6; thrombosis of internal jugular, 6; removal of granulations and polypi, 62.

CLEMENS.

20. Number of ear patients, 4044; throat patients, 3460; ear operations, 1379; paracentesis of membrana tympani, 35; ossicectomy, 6; mastoidectomy, 111; cerebral abscess, 2; thrombosis of lateral sinus, 2; thrombosis of internal jugular, 2; radical operation, 9; removal of granulations and polypi, 36.

CLEMENS.

21. Number of ear patients, 3638; mastoidectomy, 33; radical operation, 23; ossicectomy, 10; paracentesis, 149; aural polypi, 18; nasal polypi, 56; removal of adenoids, 710; ligation of internal jugular, 1.

CLEMENS.

22. Buhe. Two unusual anatomical conditions in the temporal bone : 1. after facial paralysis of thirty-five years' standing ; 2. defect of the bulb of the jugular vein and of the sigmoid sinus. *A. f. O.*, vol. lvii., p. 101.

23. Sugar. On otitis after measles, and its prophylactic treatment. *Klinisch-therapeutische Wochenschrift*, 1903, No. 1.

24. Stenger. On the value of otitic symptoms for the diagnosis of head injuries. *Berl. klin. Wochenschr.*, 1903, No. 5.

25. Alexander and Reko. The province of the rhodan reaction of the saliva in ear diseases. *Wiener Klin. Wochenschr.*, 1902, No. 42.

26. Alt. Disturbances of musical hearing. *Wiener klin. Wochenschrift*, 1902, No. 30 and No. 31.

27. Randall. Some notes on aural vertigo. *Journal American Medical Association*, February 28, 1903.

28. Amberg. A case of diplacusis monauralis. *Journal American Medical Association*, January 24, 1903.

22. (1) The specimen was that of a person thirty-five years of age who had suffered from a complete facial paralysis following a middle-ear suppuration when six months old. It is stated that during the suppuration small pieces of bone were frequently discharged from the ear.

The main trunk of the facial nerve does not pass from the geniculate ganglion in its usual path peripherically, but passes directly through the tympanum filled in with porous bone, terminating in the external tympanic wall above and in front of the drum. A thin nerve passes on in the facial canal and joins below the second knee the peripheric main part of the nerve, which also terminates blindly in the bone a little above the junction. The bone fragments which were cast off had evidently produced a complete rupture of the facial nerve.

(2) The sigmoid sinus as well as the sigmoid sulcus are absent from the very well developed mastoid emissary downwards, and including the bulb of the jugular vein. In place of the sinus, the dura mater is slightly thickened. The internal jugular vein, which is only one-quarter as broad as normal, can be followed to the apex of the petrous pyramid. The middle ear is intact. As there are no signs of any middle-ear suppuration, especially no scar formation in the region of the jugular vein, this case cannot be considered as the result of an old sinus thrombosis, but is principally a congenital deformity. HAENEL.

23. This is a compilation of what is known in literature on the otitis of measles. The author recommends as a prophylactic

measure against this otitis the instillation of nitrate of silver solution in the nose, as proposed by Weiss. The latter author found among the cases thus treated 6.6 % cases of otitis media. SUGAR found among 60 cases, 4 % of otitis, while of 111 cases of measles of the same epidemic which were not treated in this manner the result showed 18 cases of aural complications.

WANNER.

24. In many cases of so-called traumatic neurosis, the author found subjective and objective symptoms referable to an involvement of the ear. If in these cases the functional examination of the ear reveals that in addition to the psychic disturbance a disease of the ear is really present, the question of whether disease or simulation exists is solved, and an important point for the character and severity of the head injury is given. It is not proper in these cases to speak of a purely traumatic neurosis, but better of a traumatic neurosis on the basis of disease of the ear.

MÜLLER.

25. Induced by the opposite views of Muck and Jürgens, eighty-five cases of ear disease were examined (especially chronic and acute middle-ear suppuration) with the ferric chloride reaction. The saliva irrespective of the side of the ear trouble was examined. They found that in diseases of the external ear and of the parotid the rhodan reaction in the saliva was not influenced, while in acute middle-ear inflammation the quantity of rhodan was reduced. They conclude as follows:

(1) The rhodan reaction in the saliva is of diagnostic importance in the presence of ear disease, as absence or traces of rhodan speak for a middle-ear disease.

(2) Directly after the radical operation, the quantity of rhodan is diminished. The reaction returns usually in the fourth week after the operation, and denotes an uncomplicated course of healing.

(3) Bilateral destruction of the tympanic structures may lead to a permanent diminution of rhodan.

(4) The rhodan reaction has not a general prognostic value in ear diseases.

WANNER.

26. After describing 7 cases of his own as well as a careful compilation of those found in literature, ALT reviews the various theories on the origin of diplacusis—binauralis, echotica, and monauralis. To determine experimentally to what degree

interference with sound-conduction produces a disturbance of musical hearing, the air was aspirated from the middle ear and the tube by means of the catheter, and in later cases by means of Siegle's speculum. König's tuning-forks, with electro-magnetic percussion, were employed. If the stand to which a tuning-fork of 35 vibrations was attached was placed on the mastoid process, on applying Siegle's speculum and compressing the air the tone perception for the fundamental tone was immediately lost, and in some cases a veritable overtone was perceived. If the apparatus was placed on the forehead and the air compressed in both ear canals, the fundamental tone was lost on the slightest pressure. On increased pressure the overtones were lost, and a tuning-fork of 64 vibrations produced overtones, but one with 128 produced overtones but rarely. Additional experiments were made with a simultaneous use of two tuning-forks, of which one had 32 vibrations and the other 256, or 64 and 32. On the action of the air pressure on the drum, the perception of the low tones was easily overcome. The experiments with pipes of various pitch were not as striking.

According to Alt, the increased labyrinth pressure alone is responsible for interfering with the perception of the deep tones, as on increase of the pressure the overtones also disappear, and the ear becomes deaf.

Alt believes he has found a confirmation of Zimmermann's theory in his experiments.

That in middle-ear disease the fundamental tone is not at all or only weakly transmitted, has been shown from the result of an experiment on a piano. Instead of the loud fundamental tone with the feeble overtones, one only hears the overtones which are consonant or dissonant according to the intervals. Hearing of a higher pitch is thus explained. Hearing of a lower pitch is due to the fact that on judging the pitch with a very feeble overtone one is apt to make an error of one or more octaves, so that even a practised musician may regard such an overtone as an undertone. On the other hand, variations of pressure within the labyrinth may produce a tension of the perceiving apparatus which would lead to deep hearing. False hearing may come: first, when the other ear was previously but little suited to hearing; second, when the disturbance of the clang tint produces in sensitive musicians diplacusis; and, third, when a middle-ear affection is complicated with labyrinth disease.

Alt believes the middle-ear disease has a great deal to do with false hearing, as the latter has been described ten times more frequently in diseases of the middle ear than in those of the labyrinth. *Diplacusis monauralis* he regards as a nervous symptom of neurasthenics. WANNER.

27. RANDALL has found that in the great majority of cases of aural vertigo seen by him neurotic and general vasomotor influences have seemed largely at fault for the symptom, except in the group where the catarrhal affection of the Eustachian tubes and tympanum was so clearly at fault that treatment by the catheter directed to this condition could be fairly expected to give the relief which was obtained. All cases of vertigo coming to the otologist should encourage minute methods of study as to the tympanic and labyrinthine condition, and an investigation, personally or through the aid of a judicious physician, of all the general aspects of the patient's case. He should exclude or relieve all involvements of the accessory nasal cavities, investigate the refraction and muscular conditions of the eyes, and, abating nothing of the local treatment by inflation and massage which the aural condition may seem to demand, use strychnia and other tonics according to the general needs of the patients. For vertigo of transient and otherwise undeterminable causation, the use of adrenalin may steady the circulation of the premonitory phase of the trouble and prevent the occurrence, or greatly abate the severity, of the attack. CLEMENS.

28. The patient, male, aged twenty-eight, suffered from deafness in his right ear and certain tones were heard double. When the left ear was tightly closed and a tuning-fork was sounded, two distinct tones were heard in the right ear, one appearing to be just the octave of the other. The occurrence of this symptom was first observed by the patient one morning when his little child was yelling, when sounds of a certain pitch were heard double. Under the use of the Eustachian catheter, sodium bromide, and incidental nasal treatment, the symptom disappeared. CLEMENS.

C.—METHODS OF EXAMINATION AND TREATMENT.

29. **Richards.** The use of gelato-glycerin bougies in the treatment of acute earache in young children. *Four. American Medical Association*, January 24, 1903.

30. **Snow.** Conservatism in the treatment of acute mastoiditis. *Four. American Medical Association*, January 31, 1903.

31. Matlack. Electrolysis in Eustachian salpingitis with stricture; report of seventy-five cases. *American Medicine*, February 7, 1903.

32. Lucae. A practical apparatus to apply the air douche in ear disease. *Deutsche med. Wochenschr.*, No. 11, 1903.

33. Eckstein. The therapeutic value of hard paraffine injections in general surgery. *Berl. klin. Wochenschr.*, November 12 and 13, 1903.

34. Moszkowicz. On subcutaneous paraffine injections. *Wiener klin. Wochenschrift*, 1903, No. 2.

35. Rode. Adrenalin in rhino-laryngology. *Wiener klinische Rundschau*, 1902, Nos. 33 and 34.

36. Katz. Adrenalin in examination and treatment of the nose. *Wratschebnaja Gaseta*, 1902, Nos. 49, 50, and 51.

37. Kassel. A substitute for warming the laryngeal mirror. *Arch. f. Laryngol.*, vol. xiii., p. 462.

38. Valentin. The cystoscopic examination of the naso-pharynx, or salpingoscopy. *Arch. f. Laryngol.*, vol. xiii., p. 410.

39. Veis. The importance of snoring. *Arch. f. Laryngol.*, vol. xiii., p. 321.

29. Although the use of bougies was originated by Gruber, he never described how they could be made. RICHARDS has taken the main ingredients of Wood's formula, adding 3% of carbolic acid for its well-known properties, and, with the aid of an apothecary, managed to overcome the pharmaceutic difficulties in their manufacture. A description of their use and preservation is included in the paper.

CLEMENS.

30. SNOW's object is to demonstrate that there is a middle ground for treatment, practically safe, based on free drainage and prevention of pus development. He advocates the use of the so-called internal Wilde's paracentesis, to accomplish the first indication, and the use of cold or heat, to meet the second. The cases must be carefully scrutinized, and, unless marked improvement is noted within twenty-four to thirty-six hours, better drainage must be secured, since cold or heat will not avail without it. Forty-five consecutive cases were treated on these lines without failure. All were acute, and each presented the indications usually accepted for the external operation.

CLEMENS.

31. Among the general conclusions drawn by the writer, it is said that electrolysis has been of service in all forms of deafness (excluding purely labyrinthine conditions), and especially so in cases of moderate degree, where the pathological changes were located in the tube. In sclerosis with more or less stenosis of the tube, hearing was restored to a greater extent than by any other method known to him, but how permanently cannot as yet be

stated. In sclerosis without marked tubal obstruction but with secondary involvement of the auditory nerve, electrolysis was unavailing. In cases of incipient salpingitis, the swelling disappeared completely and the functions were restored with but a few applications of the current, combined with treatment to the nasal membranes. To insure the best result, the treatment should be supplemented by other measures that have formerly been found of service. Intranasal irregularities must be corrected. MATLACK is convinced that electrolysis marks a distinct advance in aural therapy.

CLEMENS.

32. A bottle with carbonic acid gas is connected with a manometer and a screw vent. The bottle is connected with a tube to the catheter, and on opening the vent the carbonic gas escapes under uniform pressure to be used in catheterization. Unpleasant features in the use of carbonic acid gas have not been observed, though it cannot be employed in the air douche for fear of inspiration.

THIELE.

33. Instead of employing the vaseline recommended by Ger-suny for subcutaneous use, the author employs a paraffine which melts at 58°, and, owing to its rapid coagulation, preserves its original form, and the danger of a pulmonary embolus is lessened, and the paraffine cannot be absorbed. The manifold application of this method is illustrated by numerous examples. In addition to correcting the saddle-shaped noses, the deforming cicatricial retractions observed after mastoid operations and operations on the frontal sinus can be overcome after this manner. In these cases the scar tissue is freed from its underlying bony parts through a small incision, and a few days later the paraffine is injected.

MÜLLER.

34. Clinical observations on man through a period of three years have shown that paraffine is not absorbed. In histological examination of paraffine injections after two to twelve months, it has been shown that the paraffine is replaced by a large number of small, round, well-defined, open spaces, and slight round-cell infiltration without giant cells. Between large masses of vaseline there is a network of very fine detritus, in which many multinuclear leucocytes are to be seen. The intervening spaces are filled with serum. Projections pass into the vaseline deepest from the wall of the large cavities.

On injections in scar tissue or intradermic injection, a pronounced small-cell infiltration and hypertrophy of the connective-

tissue cells surrounding the vaseline are found, and especially a large number of giant cells. Resorption does not take place, but an encapsulation. From these observations a poisonous action of the vaseline can be denied. After two weeks the vaseline is so fixed by the reaction of the surrounding tissues that it cannot become displaced.

To prevent emboli the paraffine injection should be preceded by a Schleich injection, which is then aspirated to see whether there is any blood in the syringe. Instead of hard vaseline the usual German vaseline is recommended, which melts at 36° to 40° . It is sterilized by heating until it boils. When the vaseline has grown quite cold in the syringe it can be injected. In the later stages the vaseline forms cartilage-like tumors.

Twenty-eight cases of saddle-nose deformity were treated with paraffine injections. To obtain a narrow dorsum of the nose a clamp consisting of two lead plates is applied during the first week.

WANNER.

35. The action of adrenalin was examined on 140 patients. In eighty it served for operations. Its action is produced more quickly by vigorous inunctions lasting half a minute. The temporary anæmia of the parts lasts from ten to thirty minutes. After one hour the parts become distended and in the next two to four hours return to their normal size.

The postoperative hemorrhages are in many cases decidedly greater than when this agent is not used. Adrenalin is capable of arresting paracheimical hemorrhages, but has no effect on arterial hemorrhages. The strongest concentration is 1:1000. Acute inflammations react to a solution of 1:10,000. It has no anæsthetic action, and it can be well combined with cocaine. In certain cases where cocaine has produced symptoms of intoxication, the application of adrenalin seems to have acted as an antidote. Concentrated adrenalin solutions never produce any symptoms of poisoning. It can be given internally or subcutaneously without harm.

WANNER.

36. In some cases adrenalin has no action on the nasal mucosa. Like any inflamed mucous membrane of the upper respiratory tract, its action on adenoid tissue in the pharynx is energetic, and it controls small hemorrhages on the nasal septum. It does not prevent after-hemorrhage. Strong solutions may produce inflammatory reactions in the nose, which may be followed by a superficial necrosis.

SACHER.

37. After rubbing the mirror with moistened cotton and dipping it in cold water, it can be used for the examination and does not grow clouded.
ZARNIKO.

38. The condition of the tubal ostium and its surroundings, as well as of the upper wall of the naso-pharynx, the posterior surfaces of the velum, and the deeper parts of the larynx have been examined and studied by a cystoscope-like apparatus. The pictures are of great interest, and the method unquestionably is an addition to our diagnostic measures.
ZARNIKO.

39. According to the author, snoring takes place when the mouth is open as well as when it is closed. In those that snore, a characteristic appearance of the velum is found: redness, occasionally pale œdema, prolongation of the uvula. Paræsthesia of the pharynx, catarrh of the Eustachian tube, and smaller troubles are, according to the author, a consequence of snoring. To overcome snoring, a simple bandage fixing the chin is recommended. (The author has appeared to confound mouth-breathing with one of its consequences, snoring, which has led to mistakes.)
ZARNIKO.

d.—DEAFMUTISM.

40. Kreidel and Alexander. The results of a statistic of the bodily and mental development of deaf-mutes in Austria during the first year. *Wiener klin. Wochenschr.*, 1902, No. 16.

41. Habermann. The development of deafmutism after middle-ear diseases. *Arch. f. Ohrenheilk.*, vol. lvii., 579.

40. The authors have investigated the kinship, the kind of deafmutism, speech, mental capacity, and walking of a certain number of deaf-mutes, in order to determine the bodily and mental capabilities in the early years before admission to schools. They had hoped thereby to receive instructions on the best methods of early education.
WANNER.

41. HABERMANN has added a fourth case to the three cases of deafmutism from occlusion of both windows, which he has demonstrated in Dresden and Breslau. In the present case the histological examination showed as the cause for the deafmutism in a woman of forty-one years of age, fixation of the stapes, bony occlusion of the round window, following probably a middle-ear suppuration occurring in the first years. No pathological changes of importance were found in the brain, the auditory nerves, nor in the middle ear.
HAENEL.

42. **Sack.** The treatment of otitis externa furunculosa with packing. *Monats. f. Ohrenheilk.*, 1903, 1.

43. **Iwanow.** On local anæsthesia in paracentesis of the drum membrane. *Prakt. Wratsch.*, 1902, No. 49.

44. **Gomperz.** New artificial drums. *Wiener med. Wochenschr.*, 1902, Nos. 50, 51.

45. **Thompson.** A knife blade in the ear. *Cincinnati Lancet-Clinic*, March 28, 1903.

42. The author recommends Lamann's treatment of external otitis, which consists in packing the canal with a 10 per cent carbolic glycerine gauze, and advises during the treatment of the diseased ear to instil 10 per cent. solution of carbolic acid glycerine in the healthy one. PIFFL.

43. The author considers Bohain's mixture (carbolic acid 2.0, menthol, cocaine, each 0.5) and Gray's mixture (cocaine, aniline oil, absolute alcohol, 5.0) unsuitable, because they produce an irritation of the drum. As the action of cocaine is increased by the admixture of adrenalin, he recommends a mixture of cocaine 0.5 and 1.0 of a 1% adrenalin solution. Small pledgets of cotton soaked in this solution, heated, are applied to the drum, and after ten minutes complete anæsthesia results. SACHER.

44. In the cases where a perforation in the drum does not close on cauterization with trichloracetic acid, an artificial drum may be applied. In those cases only in which the drum is disturbed except a small margin and the hammer still remains, can good results be expected from an artificial drum.

These are prepared, according to the author, from thin celluloid plates, and vaseline of a melting point of 41-42° C. is injected. Little plates of silver 0.02-0.004mm thickness are also used, and are introduced with a pair of forceps. Recently he has employed fluids of chemically pure leaf silver under 1 μ thickness. The introduction and removal are attained by syringing. All of these artificial drums could produce no irritation of the tympanic mucous membrane, and may remain in place for weeks or months without causing suppuration. Before introduction, the canal is thoroughly cleansed with alcohol and ether and 5 per cent. menthol vaseline.

The accompanying case-histories show that by means of these drums the hearing distance was increased from a few centimetres to several metres for whisper. These prostheses are especially

suited for children, where a destruction of the drum has taken place after scarlet fever. ' WANNER.

45. Patient, male, aged twenty-five years, complained of a mixed bloody and purulent discharge from the right ear for past seven weeks; hearing somewhat impaired. The external meatus was found filled with exuberant granulations. A probe encountered a rough hard substance suggesting metal. After the granulations were removed, a black substance could be seen imbedded in the auditory canal, which was found so firmly fixed that it could not be extracted by the use of forceps or hook. A careful examination behind and below the ear demonstrated a foreign substance extending an inch into the tissues of the neck. Through an incision behind the ear, a broken knife-blade more than an inch long and of the usual width was removed. It was below the deep cervical fascia and partially imbedded in the sterno-mastoid muscle. Two years ago the patient was stabbed in the ear, but the wound promptly healed and gave no trouble until the present time. CLEMENS.

THE MIDDLE EAR.

a.—ACUTE OTITIS.

46. Eitelberg. On the symptomatology of acute inflammations of the ear. *Deutsche med. Wochenschr.*, No. 5, 1903.

47. Hofmann. Two cases of middle-ear suppuration after scarlet fever with unusual cause. *Wratschebnaja Gazeta*, 1903, No. 8.

48. Massier. Two cases of circumscribed abscess of the temporal fossa of otitic origin. *La presse otolaryngologique Belge*, 1902, vol. xi.

49. Large. A case of exophthalmos following mastoiditis. *Annals Otology, Rhinology, and Laryngology*, Nov., 1902.

46. In discussing the etiology of acute otitis media, the inhalation of fluids as well as manipulations in the nose are emphasized. During the course of an inflammatory process in the middle ear and in the external canal, a sudden intense pain, accompanied by other severe symptoms, may be regarded favorably, though this view is purely empirical. In the course of an otitis media a sudden rise of temperature may be harmless, and in no connection with the original trouble. A number of cases is added.

THIELE.

47. CASE 1. Double-sided, abundant middle-ear suppuration in a girl fifteen years old, after scarlet fever of four months' duration. Left facial paralysis. Large cavities filled with pus in the region of the mastoid process. On opening the cavities on the

right side there was a number of small and in the left of larger sequestra lying free in pus, representing the entire mastoid process. Recovery.

CASE 2. A boy eight years of age with acute otitis on the right side after scarlet fever. Aside from very severe symptoms of a purulent mastoiditis (inflammation with fluctuation in the region of the mastoid, sagging of the upper and posterior meatal walls, high fever, headache), the operation could not be performed on account of the nephritis with ascites. Gradual diminution of the mastoiditis, with complete healing of the drum and normal hearing without operation.

SACHER.

48. MASSIER observed two cases of abscess of the temporal fossa, which were unusual and ran a different course. The one followed a dermatitis of the external auditory canal; the second was in connection with an acute middle-ear inflammation.

BRANDT.

49. The patient, male, aged thirty-five, was operated upon for nasal polypi, forty being removed from the nostrils in six sittings. Sometime afterward a quantity of cerumen was removed from both auditory canals, and on the following day otitis media developed. A free paracentesis was performed, allowing a quantity of serum to escape. A few hours afterward the pain was entirely relieved. On the third day after the paracentesis, pain over the mastoid began, which was overcome by the application of the ice-bag. The temperature was irregular in character. On the twelfth night the patient became delirious, temperature 104° F., exophthalmos with diplopia occurring in the left eye. The mastoid was opened and found filled with offensive pus. No fistulous opening into the cerebral cavity could be detected. The following day the exophthalmos disappeared and the temperature fell to 99.5° F., and the case made a satisfactory recovery.

CLEMENS.

b.—CHRONIC OTITIS.

50. **von Herrenschiwand.** Contribution to the surgical treatment of purulent mastoiditis. *Inaug. Dissert.*, Bern, 1902.

51. **Baumann.** The tertiary syphilitic middle-ear suppuration. *Inaug. Dissert.*, 1902, Bonn.

52. **Alexander.** On the performance of the radical operation with Schleich's local anæsthesia. *A. f. O.*, vol. lvii., p. 91.

53. **Eeman.** A new method of dressing after the radical operation for the cure of the purulent otitis with caries, cholesteatoma, etc. *La Presse oto-laryngologique Belge*, 1903, No. 1.

50. This paper emanating from Kocher's clinic in Berne requires a discussion not so much on account of its scientific contents as it is of importance to show the position which a number of the first surgical clinics assume in regard to otology. The paper consists principally in the histories of fifty-nine patients who were operated on for purulent mastoiditis in the clinic at Berne from 1874 to 1901. Unfortunately there are a great many defects in the histories in regard to the otoscopic and the functional conditions. It seems to us that the author's judgment in a certain number of cases has not been correct: for instance, in Case 7, where unquestionably a suppuration of the labyrinth with death from pyæmia existed; in Case 31, a chronic middle-ear suppuration with cholesteatoma, which is classed under the acute cases; and in regard to a number of cases of cholesteatoma in which this condition was evidently not recognized. The general remarks and conclusions are not convincing, especially as the author depends entirely upon his own material, without regard to the special literature on the subject. For example, on page 4 it is stated that an objection to Stacke's operation is the almost complete loss of hearing; on page 47 that the Schwartze-Kocher trephining of the mastoid process leads in most chronic cases to a good result, unless streptococci are the agents in question; on page 48 that the presence of streptococci should indicate a more radical intervention from the beginning; and, finally, to recover a good hearing power, an operation should be done very early. In addition there is a number of slight arithmetical inaccuracies.

Of greater interest to the reviewer was a criticism of the methods and results of operations on the mastoid process performed in the Berne clinic. He states on page 4: It will be seen from our tables that until the very latest time, in acute as well as in chronic cases, trephining of the antrum or of the entire mastoid process was the only surgical operation performed. Stacke's operation was done in only two cases, and both of these were acute. Why in these cases this operation was undertaken cannot be told from the case-histories. The results are as follows: among 59 operations, 8 fatal cases, of which according to the author only 3 might be placed to the account of an insufficient treatment; 10 cases unhealed, 4 injuries to the sinus, 2 facial paralyses, in 2 the antrum could not be found, in 16 marked

or total loss of hearing. Case 39 was an unusually unfortunate one for the operator, for without finding the antrum he succeeded in injuring the sinus, the facial nerve, and the dura of the middle cerebral fossa. The autopsy four days later revealed the antrum and tympanic cavity to be full of pus. The author appears to recognize that these results are not quite up to what is obtained in certain special clinics, for he states in a preface that the operations were mostly performed by rapidly rotating assistants, and the results correspond to those obtained by a practitioner but little versed in otology. On account of this, and while there are enough cases with complications of various kinds leading into the province belonging to the general surgeon, the author thinks it is desirable that a surgeon should speak on this subject. It is, of course, quite plain that a practising physician, under unfavorable circumstances and without complete control of the technicalities, must frequently be forced to operate, and not always get such good results as the practised specialist, though it does not seem right that a large clinic should make a rule from these exceptional cases and for years perform these important operations on so necessary a sensory organ without proper indications and suitable training. If the surgeon should in a similar manner encroach upon the territory of the eye specialist, there would be a storm of indignation arising not only from the ophthalmologists but from many medical circles. And what is true for the eye holds for the ear as well. If the publication of this author serves the purpose of showing that the University at Berne is in great need of a special ear clinic, it will at least have achieved considerable purpose.

RAU.

51. A patient fifty-five years of age was suddenly taken ill with ear pain. There were polypi and small sequestra in the canal. The drum was very much reddened, pulsating discharge, nose and pharynx normal. As the suppuration remained profuse, a trephining operation was done after four months. No especial change in the mastoid process. Eight days later, pain in the neck; a syphilitic ulcer was found in the pharynx. Iodide of potash was given. The profuse middle-ear suppuration was healed in three days, the ulcer got well, so that the syphilitic nature of the middle-ear suppuration is proven. Report of literature.

BRÜHL.

52. After experimenting with local anæsthesia according to Schleich in two cases of radical operation, the author cannot

recommend this procedure. It was not possible to obtain a sufficient analgesia to clear out the tympanum and the antrum as well as the tympanic opening of the tube. HAENEL.

53. This author treated one of his radical operations accidentally with boracic acid in powder form, and was astonished at the rapid epidermization of the cavity. Further experiments have convinced him that this procedure should receive more attention. The technique is as follows: after the operation on the bone, the flap is pressed with iodoform gauze against the bony surface, and the wound behind the ear is closed with sutures. On the first change of dressing, four, five, or six days after operation, the gauze is carefully removed and the cavity dried. Then the entire cavity is filled with boracic acid up to the entrance of the external canal. The aural region is covered with iodoform or boracic-acid gauze. The dressing must be changed daily for about fourteen days. As the secretion diminishes, the quantity of powder may be reduced, so that in the last stages the unhealed places only are covered with a slight layer of boracic acid. The granulations remain in normal bounds, and the epidermization progresses rapidly. BRANDT.

54. The cases reported are considered primary tubercular infection. All of the number were seen more than three years ago; three of them are still living, and fail to show any tubercular trouble at present. There is no evidence or history to demonstrate the presence of tubercular affection in the families of these patients. In three of the cases the mastoid was extensively involved, showing an active and rapid invasion. The mastoiditis developed from a pre-existing chronic otitis media suppurativa, and was apparently due to a direct invasion of the tubercle bacillus. The wounds healed firmly by healthy granulations, and all tubercular trouble ceased with the removal of the local process, which is in marked contrast to the process of repair when systemic invasion is present. CLEMENS.

C.—CEREBRAL COMPLICATIONS.

55. **Schulze.** On empyema of the saccus endolymphaticus, *A. f. O.*, vol. lvii., p. 67.

56. **Papanikolaou.** A remarkable case of Bezold's mastoiditis with extradural abscess. *M. f. O.*, 1903, 1.

57. **Hölscher.** A case of abnormal development of an accessory occipital sinus after one-sided thrombosis of the transverse sinus. *Wiener klin. Rundschau*, 1902, No. 28.

58. D'Eloore. Chronic suppurating otitis complicated with cerebral abscess. *La Presse oto-laryngologique, Belge*, 1902, vol. ii.
59. Fliess. Cerebral abscess with sudden paralysis of the respiratory centre. *Deutsche med. Wochenschr.*, No. 14, 1903.
60. Lannois et Armand. Abscess of the cerebellum after labyrinthine suppuration. *Arch. internat. d'otol.*, etc., 1903, p. 14.
61. Grunert. Further contribution to infectious thrombosis of the bulb of the jugular vein and on the question of its operative treatment. *A. f. O.*, vol. lvii., p. 23.
62. Voss. On the opening of the cavernous sinus in thrombosis. *Centralbl. f. Chir.*, 1902, No. 47.

55. With due regard to Jansen's paper (1893) on this same subject, and to the cases of Kümmel and Muck, the author reports on the origin, extension, and course of a case, which was confirmed at autopsy. Complete operation after middle-ear suppuration of half a year. Caries of the tympanic walls and of the antrum, and below the facial spur. After the operation facial paralysis. After nine weeks of apparent health, sudden illness with severe headache, vomiting, vertigo, but without fever. The reflexes, motility, and sensibility were normal, as well as the eye grounds. The symptoms persisted for five days, returned after two weeks, then on the following day patient had a severe chill, a very small pulse, and died in symptoms of paralysis. A suppuration of the labyrinth, which was undiscovered and not proven by the hearing test, especially of the vestibule and of the semicircular canals (infection from the patent oval window), had led to an empyema of the saccus endolymphaticus as large as a cherry, which ran a course without symptoms, until, from the progress of the inflammation about two and a half weeks before death, under the appearance of headache, vomiting, and nausea a cerebral abscess developed. Death resulted from rupture of the empyema of the saccus endolymphaticus into the meninges. The following conclusions are reached:

(1) The empyema of the saccus endolymphaticus does not necessarily cause fever, and may be present without disturbing the sensorium. The symptoms, as pronounced by Jansen to be characteristic, do not necessarily belong to the picture of uncomplicated empyema of this sac.

(2) An empyema of the sac may exist, in addition to the labyrinth suppuration, without causing any characteristic clinical symptoms, or any which can be used in the differential diagnosis from a suppuration of the labyrinth.

HAENEL.

56. This case does not present any peculiarities. The early healing of the middle-ear affection with a continuation of the process in the mastoid is known to every aural surgeon. PIFFL.

57. The patient, fourteen years of age, had suffered since early childhood from middle-ear suppuration on the left side, and, six years before the onset of the threatening symptoms which led to operation, had passed through a severe brain inflammation. The autopsy after the operation (eleven days later) showed an abscess in the left cerebellar hemisphere, an old organized thrombosis of the left sigmoid sinus, and compensatory formation of an occipital sinus on the opposite side.

According to the author, the sinus thrombosis was the result of the so-called brain inflammation in the eighth year, and the compensatory dilatation of the right occipital sinus then took place. At the same time, owing to the adjustability of the child's skull, the left jugular foramen and the surrounding emissaries remained back in their development, while the corresponding outlets of the right side became abnormally dilated.

From the case-histories it is interesting to note that in the course of the disease apoplectiform attacks were present, which were regarded as hysterical. (From the severity of the picture which the operation showed, these attacks were with great probability due to a deep affection of the brain, and treatment ought to have been more radical than simple electricity.)

WANNER.

58. Report of a case of cerebral abscess in which three operations had been performed. The patient was in the advanced stages of tuberculosis. Between the purulent area in the cerebellum and the caries of the mastoid process there was a distinct connection. The nervous symptoms which had bothered the patient for six months were presumably due to a pachymeningitis on the posterior surface of the temporal bone. Notwithstanding the intracranial pressure, the pulse remained normal; temperature was often subnormal. The important symptoms were: headache, fibrillary twitching of the tongue, increase of the reflexes, Romberg's symptom, and oculomotor paralysis.

BRANDT.

59. A patient with left-sided chronic otorrhœa was taken suddenly ill with symptoms pointing to a cerebral abscess. At the beginning of the operation, after the first few strokes of the chisel, a paralysis of respiration set in, which led to death. The heart

continued to beat for hours. The diagnosis of cerebral abscess was confirmed at autopsy.

THIELE.

60. A cerebral abscess in a patient seventeen years of age, following left-sided chronic middle-ear suppuration. Clinical symptoms uncertain. Irregular fever, headache, stupor; the antra opened with only momentary improvement. Three weeks later, after the onset of epileptiform contractions in the right leg, the left temporal lobe and the cerebellum were punctured. An abscess was found in the latter. Death followed. The macroscopic examination of the temporal bone showed a diffuse labyrinthine suppuration, dirty discoloration and thickening of the seventh and of the eighth nerves. The bony surface as well as the sinus was normal. In the left cerebral hemisphere, two abscesses which did not communicate with one another.

OPIKOFEK.

61. According to GRUNERT, the sinus operation in conjunction with ligation of the jugular is sufficient for most cases, and even for those cases where the infectious sinus thrombosis is complicated with a bulbo-thrombosis. The recovery takes place through obliteration of the bulb, with fibrous closure of the openings of the inferior petrosal sinus and the venous communications between the bulb and the vertebral vein. In the cases which run without fever after operation, one should not attack the thrombus in the bulb, not even if it is in a condition of purulent disorganization. Careful loose packing up to the bulb, with careful irrigation, is all that is required. When the fever continues after the sinus operation as a result of the absorption of infectious matter from the bulb, as soon as the general condition permits one should always attempt the less vigorous treatment, which consists, first, in attacking the bulbous contents from the cerebral end (mopping, irrigation with an introduced canula, slight packing, careful entrance with a sharp spoon). To show the danger of the curette, a case is quoted where, following perforation of the internal wall of the bulb, a fatal subdural hemorrhage took place underneath the entire hemisphere of the side operated on. Second, we should attempt to reach the bulb by way of the internal jugular vein. The immediate closure of the cervical wound after ligation of the jugular is a mistake in every case. As long as the jugular vein has a normal amount of blood, it should not be incised. If it contains infectious matter, the external wall should be excised with irrigation of the bulb

from below. Third, we may attempt by irrigation of the bulb from above or below to remove the contents of the bulb. By careful judging of the degree of pressure, these irrigations can be made without danger. If these three methods should not prove successful, or when the general condition does not permit of an expectant treatment, as a last resort the bulb should be directly and radically opened.

Three cases of operative exposure and obliteration of the thrombosed bulb of the jugular vein are reported. In the cases where the very prominent transverse process of the first cervical vertebra is in the way of the bulb operation, and has to be resected, to avoid danger of injuring the vertebral artery Grunert recommends another operative procedure, which he has up to now only performed on the cadaver. After the complete operation, the lower and sometimes the inner part of the anterior bony auditory wall, the lower part of the tympanic margin as well as the floor of the tympanum, are removed up to the labyrinth wall. From this point it is possible by removing the roof of the attic, to expose the sulcus of the bulb. A disturbance of the maxillary joint need not be expected. There is some danger of wounding the internal carotid.

HAENEL.

62. The cavernous sinus was opened in a patient where meningitis already existed. The first and second branch of the fifth nerve, the Gasserian ganglion, behind which the sinus is situated, serve as landmarks. Removal of the base of the skull according to Lexer. Exposure of the ganglion Gasserii after removal of the bone of the base of the skull up to the foramen ovale and rotundum. The autopsy showed that it had been possible to open the sinus for a distance of 6 to 8mm.

BRÜHL.

d.—OTHER MIDDLE-EAR DISEASES.

63. **Haug.** Foreign body in the tubal region after the previous radical operation. Tonsillar abscess. *A. f. O.*, vol. lvii., p. 45.

64. **Tansley.** A piece of bougie in the Eustachian tube. *Laryngoscope*, January, 1903.

65. **Hartz.** The pathology and diagnosis of otitis media insidiosa (*i. e.*, sclerosis) with remarks on the treatment. *Annals of Otology, Rhinology, and Laryngology*, November, 1902.

66. **Amberg.** A case of scotoma auris partiale centrale et periphericum. *Jour. Amer. Med. Assoc.*, January 17, 1903.

67. **Baldwin.** The teeth as a cause of pathologic conditions in the throat, nose, and ear. *Jour. Amer. Med. Assoc.*, January 31, 1903.

63. A small pledget of cotton disappeared in the depth of the auditory canal in a patient upon whom a radical operation had been performed. After unsuccessful attempts at removal on the side of the patient, the patient returned suffering from pain in the ear and in the neck, and a swelling of the canal and tympanic walls, and fetid discharge. The Eustachian tube was impassable; on the fifth day chill; on the seventh an abscess appeared in the peritonsillar tissue. On evacuation the cotton pledget appeared. Immediate improvement and recovery after five days. It is supposed that the piece of cotton was forced during the attempts at extraction through a defect in the tympanum, and had reached the peritonsillar tissue through the levator muscle. HAENEL.

64. TANSLEY describes a case of deafness and tinnitus treated by electrolysis. During one of the treatments its application caused such pain and increase of the deafness and tinnitus that the patient finally applied to him for relief. At his first examination he discovered something protruding from the tube that gave a metallic feel to the probe. After several attempts he succeeded with a pair of delicate forceps in removing the bulbous point of a bougie that had broken off within the tube. The case is reported not only to demonstrate one of the dangers attending this mode of treatment but to pronounce his unqualified disapproval of it. CLEMENS.

65. Sclerosis is fundamentally a hyperplasia of the bony capsule of the labyrinth, or a transformation of cartilage into bone with hyperostosis. It is initiated by a constitutional diathesis, such as inflammatory rheumatism, gout, syphilis, and scrofula, by diseased tonsils in the pharynx and vault, suppurations with calcareous deposits in the tympanic cavity, exposure to wet, cold, and injury. It is usually found localized in the labyrinth capsule near the stapes articulation with the oval window, inducing fixation of the ossicles. It may involve the semicircular canals and cochlea, producing symptoms of nervous deafness. The functional test, the subjective symptoms, and family history permit an early diagnosis. The symptoms are, hyperæmia of the promontory, heredity, Schwabach test showing prolonged bone conduction, Rinne negative to a varying degree, and defective perception of one-half to one and one-half octaves of the low tones. Probably 10% of the middle-ear diseases are true sclerosis and are designated synonymously, capsulitis labyrinthi, oto-sclerosis, spongification, dry middle-ear catarrh, and otitis media insidiosa. The therapy is

effective in early stages of the disease by **hygienic** and medical treatment.

CLEMENS.

66. The patient, female, aged about forty, was under treatment for chronic middle-ear catarrh which followed an attack of grippe. There did not seem to be anything unusual in the case, until the following observation was quite accidentally discovered by her. It appears that she could hear a clock when it was held in a position upward from her right ear, but that she could not hear the same clock at the same distance when held on a level with the ear. AMBERG verified this in a very careful examination, and found in addition that the watch was heard on the left side at very reduced distance opposite the canal, and not above and below the auricle. Several weeks later the symptom was less constant, and finally it could not be demonstrated, although the patient reported that she still heard better in the right ear when the clock was held high.

The writer does not attempt to explain the phenomenon, but is inclined to attribute it to the formation of the concha and meatus, to the quality of the membrana tympani, or to a functional neurosis.

CLEMENS.

67. In about 62.5 % of the cases of otitis the teeth were found diseased, and when the teeth were cared for the improvement was much more rapid. Seven cases of earache were due to exposed dental pulp; two cases of severe earache occurred during the regulating of cuspid teeth; earache has occurred during the filling of teeth, this when there was no pain in the teeth themselves; one case of earache and unilateral coryza was due to sensitive dentine, both were almost immediately relieved by filling of the tooth, and both promptly returned on its removal; eleven cases of tinnitus were much relieved, if not entirely cured, by treatment of the teeth. A very strong plea is made for the association of dentistry with otology, rhinology, and laryngology in clinical work.

CLEMENS.

(To be continued.)

BOOK REVIEWS.

XII.—The American Illustrated Medical Dictionary. By W. A. NEWMAN DORLAND, A.M., M.D. Third edition. Thoroughly revised. Large octavo, 800 pages, bound in flexible leather. W. B. Saunders & Co., Philadelphia, 1903. Price \$4.50 net.

This is a very elaborate and beautifully gotten-up dictionary. The illustrations, many of which are in color, are excellent, especially those on the blood, malarial parasites, and spinal cord. A great deal of useful information is arranged in the form of tables. The choice of type and paper is admirable. The flexible leather binding adds comfort to the pleasure and satisfaction derived from using such a book. A. K.

XIII.—The American Pocket Medical Dictionary. By W. A. NEWMAN DORLAND, M.D. 566 pages and 64 extensive tables; flexible leather. W. B. Saunders & Co., Philadelphia, 1903. Price, \$1 net.

A pocket edition of the preceding book, but without plates. Many tables are inserted, including a table of doses at the end. The selection of words is apparently complete and excellently fulfils its purpose. A. K.

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